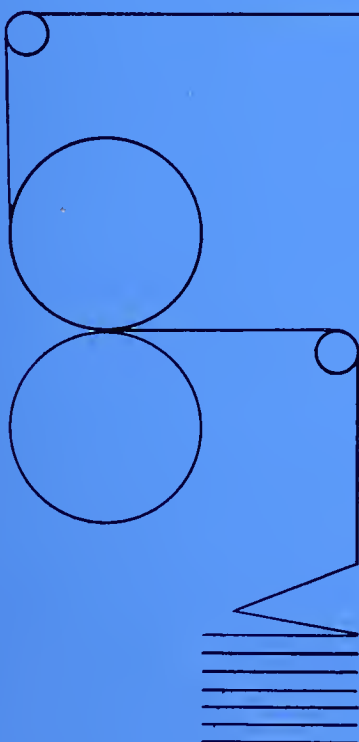


Graphic Arts

AS AN AREA OF
**INDUSTRIAL ARTS INSTRUCTION IN
PENNSYLVANIA PUBLIC SCHOOLS**

SUBJECT AREAS

Automotive	Home Mechanics	Plastics
Ceramics	Metal Forming	Sheet Metal
Electricity	Metal Machining	Textiles
Graphic Arts	Planning	Woodworking



BULLETIN 331D

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF PUBLIC INSTRUCTION • Harrisburg



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Graphic Arts

AS AN AREA OF

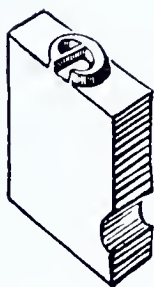
INDUSTRIAL ARTS INSTRUCTION IN PENNSYLVANIA PUBLIC SCHOOLS



BULLETIN 331D • 1952

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF PUBLIC INSTRUCTION • Harrisburg

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Foreword

GRAPHIC ARTS is one of a series of bulletins on specific areas of instruction in the broad field of Industrial Arts Education. It supplements *Industrial Arts in Pennsylvania*, Bulletin 331, published in September, 1951, by the Department of Public Instruction, by presenting details pertaining to Graphic Arts as an Industrial Arts school subject.

In response to the need manifested in requests from Pennsylvania educators for information and assistance in this field, this bulletin was prepared by R. Randolph Karch, Adviser, Trade and Industrial Education, under the direction of Robert T. Stoner, Chief of Trade and Industrial Education. Valuable assistance was given by the Area Coordinators of Trade and Industrial Education, and able Graphic Arts teachers.

Rachel S. Turner, Editor for the Department of Public Instruction, has edited this bulletin.

Francis B. Foss

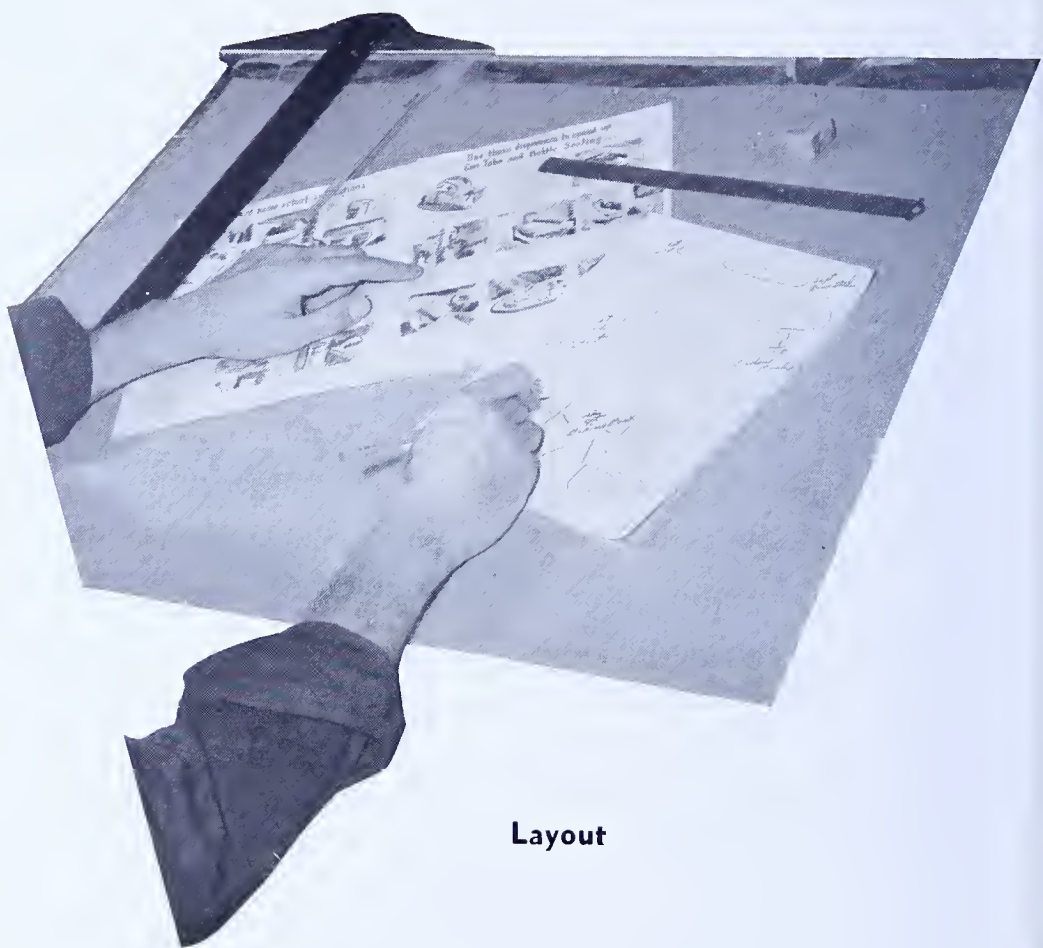
Superintendent of Public Instruction

NOVEMBER 1952

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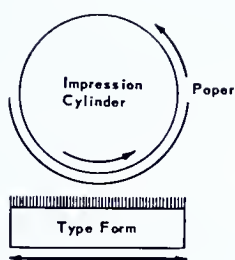
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Introduction_____

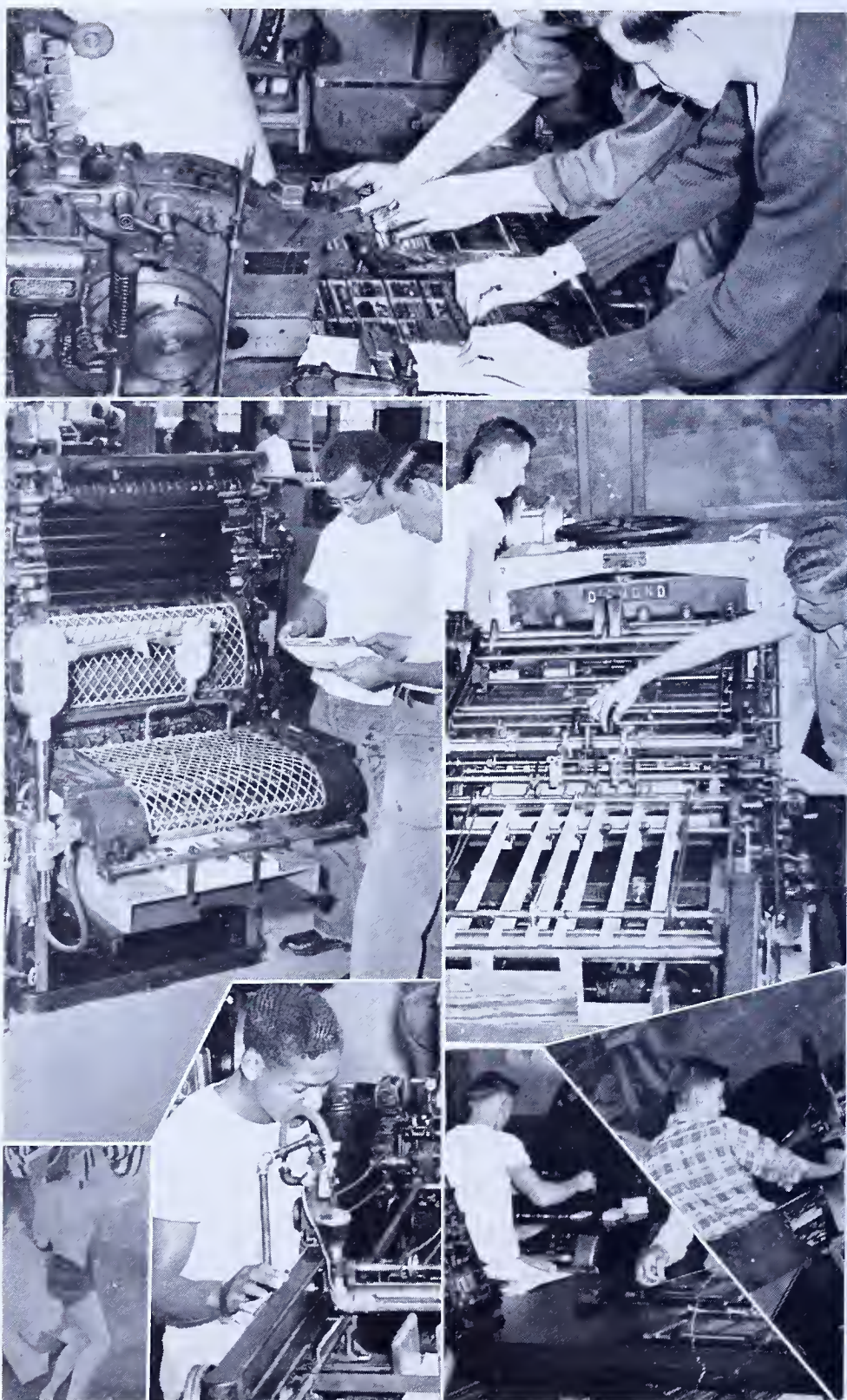
THAT GRAPHIC ARTS play a major role in life is indicated by our daily contacts with printed material of all kinds. From printed birth announcement to published obituary, we are today instructed, informed, and entertained by printed products, covering both vocational and avocational interests. Business and education, as now conducted, would cease to exist were it not for the printed material in use. The printing and paper industries of the Commonwealth have grown steadily in employment over a period of years, and have now passed the \$889,000,000 point in value.¹

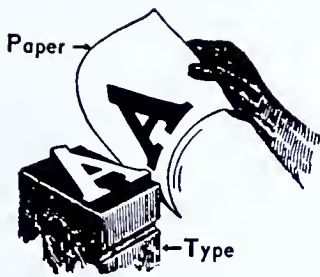
Because of the differences in educational concepts and backgrounds of administrator and teacher, because of variation in the time pupils spend in the activity, in the amount of funds available for equipment and supplies, as well as other factors, no attempt is made in this bulletin to set up a common course of study applicable to all situations, or to tell the teacher what to teach, or how to teach, or what equipment he should have in his shop. From the "Doing" and "Knowing" sections of this bulletin on pages 5 through 12, the teacher may select the course content which best answers his particular aims and objectives. The time and equipment available to pupils in the Graphic Arts course must also be considered.

Suggestions for the administrator include information related to establishing or enriching the Graphic Arts unit of a comprehensive general shop and a unit (one activity) shop.

Matters pertaining to Industrial Arts in general are not discussed in this bulletin. For such material the reader is referred to bulletin 331, *Industrial Arts in Pennsylvania*, published by the Department of Public Instruction in September, 1951.

¹ *Pennsylvania Planning*, "Know Your Pennsylvania" issue, Department of Commerce, State Planning Board, September, 1949, p. 39.





1 *Graphic Arts*

AS A SCHOOL SUBJECT

TODAY'S GRAPHIC ARTS¹ is not yesterday's "Printing." In the early days of Industrial Arts printing courses, little except hand composition of type and a smattering of presswork was offered. To meet today's needs, Graphic Arts as a unit course has supplanted "Printing," and has been greatly enriched.

Aims and Objectives

The aims and objectives of Industrial Arts education are fully covered on pages 15 through 34 in Bulletin 331, *Industrial Arts in Pennsylvania*, published by the Department of Public Instruction in 1951. In addition to these general aims and objectives, the specific aims and objectives of Graphic Arts in the Industrial Arts program include:

1. Understanding the contributions of the Graphic Arts to business, industry, education, and the professions
2. Providing a background of knowledge and minor skills leading to the intelligent selection of an avocational interest
3. Knowing the facts concerning the many occupations available in the Graphic Arts field
4. Recognizing and appreciating good typographical design, a well-printed product, and its cost
5. Planning a job of printing intelligently
6. Using the printer's technical terms to order Graphic Arts products
7. Knowing the various processes used in the Graphic Arts and their application through particular methods, tools, and materials to various forms of printing

A selection of the specific objectives listed above should be made by the teacher of Graphic Arts to suit his grade level of instruction.

¹ In this bulletin when the term Graphic Arts refers to a unit course in the curriculum, it is considered in this sense a singular noun. However, as the term is used to refer to the several arts involved, it is plural in its connotation.

Materials

A wide variety of materials should be used to meet the broad objectives of Industrial Arts and to provide the pupil with the media for desirable and needed experiences so that he can be better fitted for life. These are such materials as paper, ink, metals (lead, tin, antimony, copper, zinc, aluminum), acids, chemicals, cellulose acetate, glues and pastes, color filters, films, and stencils.

Tools

Tools of the Graphic Arts worker are, in part, those of the composition area: composing sticks, cases, types, proof presses, type high gauges, etc. In presswork they are the printing machine, the spatula, wrenches, gauge pins, etc. In bindery they are the sewing frame, the saw, the vise, needles, etc. In silk screen they are the printing frame, knives, squeegee, etc. In platemaking they are the gouges and similar tools for making rubber, linoleum, and wood blocks. In layout and design the tools include the drawing board, T-square, triangle, line gauges, pencils, crayons, etc. In offset-lithography the equipment includes the offset press or duplicator for the offset method of printing, and a plate "burning-in" device for making plates from negatives on presensitized plates.

Methods

Even though the small Graphic Arts unit of a comprehensive general shop is limited in equipment and tools, much can be taught about present-day methods in industry. Basic hand composition can be taught in the shop, as well as an introduction to such methods of type composition as linotype, ludlow, monotype, and imposition.

Processes

The methods of placing ink on paper can also be learned. The basic letterpress process and silk screen can be learned by doing in the shop. The methods of offset-lithography, gravure, collotype, copperplate, and steelplate engraving, if not taught in a small way in the shop, can be learned through such teaching devices as charts, samples, displays, and adequate reference books which contain the necessary illustrations.

Occupations

Knowledge of the occupations within the Graphic Arts industries should not be omitted from the general shop unit. This includes not only a listing of the occupations, but also of the working conditions,

wages, desirable qualities, preparation needed, opportunities for advancement, and advantages or disadvantages of the job. Such jobs as ad compositor, layout man, composition machine operator, make-up man, proofreader and copyholder, stone man, platen, cylinder and rotary pressman, cutter, bookbinder, lithographic artist, dot etcher, platemaker, opaquer, salesman, photoengraver, electrotyper, stereotyper, and others can be taught through the use of adequate and available reference material, or from teacher-made information sheets.

Graphic Arts as an Integral Part of a Comprehensive General Industrial Arts Shop

This bulletin is mostly concerned with the Graphic Arts as an integral part of at least four activities in a comprehensive general Industrial Arts shop. Such a shop is equipped to provide working and learning space for five pupils.

Graphic Arts may be combined with any of the other Industrial Arts activities, although when combined with dust-producing areas, such as woodworking, it should be separated by wood and glass partitions.

Subareas suggested for the Graphic Arts Area in the Comprehensive General Shop are type composition, layout and design, letterpress presswork, offset-lithography, platemaking and presswork, platemaking, silk screen, and bindery.

The teacher of graphic arts in either the comprehensive general shop or the unit shop (see page 52, *Industrial Arts in Pennsylvania*, Bulletin 331) may select any or all of the subareas which meet the needs of his objectives. Shop time available to pupils, and available equipment and supplies must also be taken into consideration.

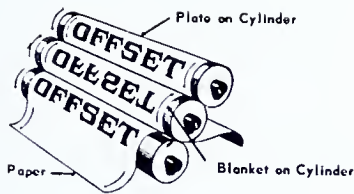
Graphic Arts as a General Unit Shop

Graphic Arts embrace many trades as well as several professions. A general shop in Graphic Arts is entirely feasible within the limits of the teacher's ability and knowledge of the activities, time available to pupils in the shop, and available equipment and supplies. In this respect it would be a "unit shop" (one activity), but would be subdivided into several areas.

Such a general shop may have an area set aside for the editorial staff of the several school publications. The newspaper staff, school annual staff, and school magazine staff may have their own planning and writing department equipped with tables, desks, and typewriters.

A general shop in graphic arts may include many processes, methods, and operations in the following subareas:

1. *Composition*
 - a. Hand
 - b. Line-casting machine (linotype or intertype)
 - c. "Cold type" processes, such as Vari-Typer, IBM Electric Typewriter, DSJ Coxhead Composing Machine
 - d. Reproduction proofing for offset-lithography
 - e. Complete "knowing units" in other composition practices such as Monotype, Ludlow, Fotosetter
2. *Presswork*
 - a. Platen hand-fed presses
 - b. Platen presses with automatic sheet feeders
 - c. Small cylinder press
 - d. Raised-letter printing
 - e. Complete "knowing units" on large cylinder presses and rotary machines
3. *Platemaking*
 - a. Line plate photoengraving
 - b. Halftone plate photoengraving
 - c. Etching
 - d. Linoleum, rubber, and wood block cutting
 - e. Stereotyping
 - f. Complete "knowing units" on four-color process platemaking, copperplate engraving, gravure, photo-gelatin plates, etc.
4. *Bindery*
 - a. Stitching, folding, cutting, bookbinding, and perforating equipment
 - b. Complete "knowing units" on gang stitchers, sewing machines, "perfect binding," etc.
5. *Layout and Design*
 - a. Equipment and supplies for design and layout of printed matter
 - b. Complete "knowing units" on good design, reset specimens, etc.
6. *Silk Screen*
 - a. Complete equipment and supplies, with hand presses
 - b. Complete "knowing units" for photographic silk screen, automatic silk screen presses, etc.
7. *Offset-Lithography*
 - a. A small offset press, perhaps 14x20-inch sheet capacity, dark room, dark room camera, whirler, vacuum frame, etc.
 - b. Complete "knowing units" on web-fed offset presses, four- and five-color presses, dot etching, etc.
8. *Photography.* (Using same area as offset-lithography)
 - a. Various makes of cameras, developing and printing equipment, enlarger, contact printing frame, etc.
 - b. Complete "knowing units" on photographic techniques



2 Learning Units _____

THINGS TO Do

THE PURPOSE OF THIS BULLETIN is to help in developing a Graphic Arts area in a four-area comprehensive general shop. It is suggested that the Graphic Arts activities be broken down into seven subareas: composition, layout and design, presswork, offset-lithography, platemaking, silk screen, and bindery.

A Graphic Arts area may be established with a few of the seven subareas suggested and later increased to the total number.

The following units, "Things to Do," are suggested for use in planning such a Graphic Arts area of instruction. On the following pages the "doing" units are broken down into the seven activities mentioned above; each unit is indicated in its respective area of activity.

Although to some the list of things to do seems lengthy and impossible to cover in the usual time given to Industrial Arts education, it is certainly not all-inclusive of the Graphic Arts industry.

A selection from this list may be made by the teacher to fit his objectives, time schedules, equipment, and grades taught.

THINGS TO DO

THINGS TO DO—LEARNING UNITS	Composition	Layout and Design	Presswork	Offset-Lithography	Platemaking	Silk Screen	Bindery
Bind a book	—	—	—	—	—	—	x
Bind a photograph album	—	—	—	—	—	—	x
Brayer, how to use	x	—	—	—	—	—	—
Case, learn locations of letters	x	—	—	—	—	—	—
Clean a type case	x	—	—	—	—	—	—

<i>THINGS TO DO—LEARNING UNITS</i>	<i>Composition</i>	<i>Layout and Design</i>	<i>Presswork</i>	<i>Offset-Lithography</i>	<i>Platemaking</i>	<i>Silk Screen</i>	<i>Bindery</i>
Composing stick, set and use	x	—	—	—	—	—	—
Copy, hold in proofreading	x	—	—	—	—	—	—
how to mark for typesetting	x	x	—	—	—	—	—
how to prepare for typesetting	x	x	—	—	—	—	—
Copyfit manuscript to type	x	x	—	—	—	—	—
Corrections, how to make	x	—	—	—	—	—	—
Cut paper	—	—	—	—	—	—	x
Cut stencil	—	—	—	—	—	x	—
Develop offset plate	—	—	—	x	—	—	—
Display composition, how to set	x	x	—	—	—	—	—
Distribute type	x	—	—	—	—	—	—
Feed a press	—	—	x	—	—	—	—
Figure for paper cutting	—	x	—	—	—	—	x
Fold paper by hand	—	x	—	—	—	—	x
Fountain, how to set on a press	—	—	x	x	—	—	—
Gauge pins, how to set on a press	—	—	x	—	—	—	—
Grippers, how to set on a platen press	—	—	x	—	—	—	—
Hold copy for proofreader	x	—	—	—	—	—	—
Imposing table, how to lock up	x	—	x	—	—	—	—
Impression, how to secure on press	—	—	x	—	—	—	—
Indentations, how to use	x	x	—	—	—	—	—
Initial letters, how to set	x	x	—	—	—	—	—
Ink, how to use on a press	—	—	x	x	—	—	—
Jog (straighten) paper	—	—	x	—	—	—	x
Kern of type, how to protect	x	—	—	—	—	—	—
Lay out a job (ticket, letterhead, envelope, etc.)	—	x	—	—	—	—	—
Leads and slugs, how to use	x	—	—	—	—	—	—
Lead cutter, how to use	x	—	—	—	—	—	—
Leaders, how to use	x	x	—	—	—	—	—
Letterspace correctly	x	x	—	—	—	—	—
Ligatures, how to use	x	—	—	—	—	—	—
Light table, how to use	—	—	—	x	—	—	—
Line gauge, how to measure with	x	x	—	—	—	—	—
Linoleum block, how to cut	—	—	—	—	x	—	—
Lock up for a press	x	—	x	—	—	—	—
Logotypes, how to use	x	—	—	—	—	—	—
Makeredy on a press	—	—	x	—	—	—	—
Marks, proofreaders', use correctly	x	—	—	—	—	—	—
Miterer, how to use	x	—	—	—	—	—	—
Mixing type faces, how to prevent	x	—	—	—	—	—	—

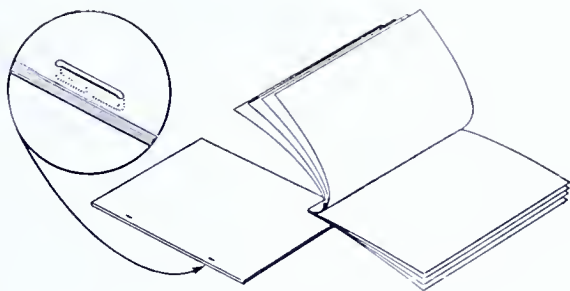
THINGS TO DO—LEARNING UNITS

	<i>Composition</i>	<i>Layout and Design</i>	<i>Presswork</i>	<i>Offset-Lithography</i>	<i>Platemaking</i>	<i>Silk Screen</i>	<i>Bindery</i>
Negatives, how to make	—	—	—	x	—	—	—
Nicks on type, how to use	x	—	—	—	—	—	—
Offset plates, how to make	—	—	—	x	—	—	—
Operate silk screen press	—	—	—	—	—	x	—
Pad (tab) paper	—	—	—	—	—	—	x
Paste covers on a bound book	—	—	—	—	—	—	x
Perforate on press	x	—	x	—	—	—	—
Planer, how to use	x	—	—	—	—	—	—
Press, how to operate,	x	—	x	x	—	—	—
how to wash	x	—	x	x	—	—	—
Proof, how to pull	x	—	—	—	—	—	—
Punch paper	—	—	—	—	—	—	x
Quads, how to set	x	—	—	—	—	—	—
Quoin, how to use	x	—	x	—	—	—	—
Rack sheets from silk screen press	—	—	—	—	—	x	—
Read proof	x	—	—	—	—	—	—
Rebind a book and volume of magazines ...	—	—	—	—	—	—	x
Register, color job on press	—	—	x	x	—	—	—
on silk screen press	—	—	—	—	—	x	—
Reglet, how to use	x	—	x	—	—	—	—
Revise a proof	x	—	—	—	—	—	—
Rollers, how to care for	x	—	x	x	—	—	—
Roman numerals, how to set	x	—	—	—	—	—	—
Round a book	—	—	—	—	—	—	x
Rule, how to set	x	x	—	—	—	—	—
Scale artwork to size	—	x	—	—	—	—	—
Score, on press	—	—	x	—	—	—	—
Sensitize offset plate	—	—	—	x	—	—	—
Sew signatures on tapes and cords	—	—	—	—	—	—	x
Spaces, differentiate between	x	—	—	—	—	—	—
Space type	x	x	—	—	—	—	—
Staple and stitch	—	—	—	—	—	—	x
Stick, how to compose type in	x	—	—	—	—	—	—
Stone proof, how to take	x	—	—	—	—	—	—
Straight composition, how to set	x	—	—	—	—	—	—
Strip negatives	—	—	—	x	—	—	—
Tabular matter, how to set	x	—	—	—	—	—	—
Thumbnail sketches, how to make	—	x	—	—	—	—	—
Tweezers, how to use	x	—	—	—	—	—	—

THINGS TO DO—LEARNING UNITS	Composition	Layout and Design	Presswork	Offset-Lithography	Platemaking	Silk Screen	Bindery
Type:							
size recognition	x	x	---	---	---	---	---
fit to copy	x	x	---	---	---	---	---
read lines of	x	---	---	---	---	---	---
tell puzzling letters	x	---	---	---	---	---	---
remove from stick	x	---	---	---	---	---	---
tie up a form of	x	---	---	---	---	---	---
high gauge, use	x	---	x	---	---	---	---
trace letters of	---	x	---	---	---	---	---
Vacuum frame, make plate on	---	---	---	x	---	---	---
Wash type forms	x	---	x	---	---	---	---
Wash presses	---	---	x	x	---	x	---
Whirler, operate	---	---	---	x	---	---	---
Woodcut, engrave	---	---	---	---	x	---	---

Page
Make-up





3 *Learning Units* _____

THINGS TO *Know*

IN ORGANIZING AND ESTABLISHING a comprehensive Graphic Arts program to meet the nonmanipulative values and outcomes of Industrial Arts education, a teacher must allot time for instruction relative to the technical consumer knowledge, and the guidance values inherent in any good Industrial Arts program.

All things pupils need to know about an industry are not presented in the “doing” activities of school shop work. For example, to know where to classify a particular type face, when that type face is not in the cases of the school shop, cannot be a “doing” operation; the manner in which colored comic sections are printed is difficult to practice in the school shop with its limited equipment; and the way in which a cylinder press prints cannot be taught unless a press of this type is available. These and scores of other activities become the “knowing” units of the course, and are best taught through the medium of information sheets or through the use of one or more of the adequate graphic arts books and the companion study guides that are available.







The following units, “Things to Know,” are suggested in planning such a graphic arts area of instruction. The units are broken down into the seven activities: composition, layout and design, presswork, offset-lithography, platemaking, silk screen, and bindery.

THINGS TO KNOW

<i>LEARNING UNITS</i>	<i>Composition</i>	<i>Layout and Design</i>	<i>Presswork</i>	<i>Offset-Lithography</i>	<i>Platenmaking</i>	<i>Silk Screen</i>	<i>Bindery</i>
Alphabet styles and designs of letters	x	x	—	—	—	—	—
Appropriateness of type faces to jobs	x	x	—	—	—	—	—
Balance	x	x	—	—	—	—	—
Basic weights of paper	—	x	—	—	—	—	x
Ben Day screens	—	x	—	—	—	—	—
Block printing, predecessor to printing	—	—	—	—	x	—	—
Case, type, layout of letters	x	—	—	—	—	—	—
lead, and slug	x	—	—	—	—	—	—
Chalk overlays	—	—	x	—	—	—	—
Colored copy, reproduction of	—	x	—	—	—	—	—
Color plates	—	x	x	—	x	—	—
Compositor, duties	x	—	—	—	—	—	—
Comprehensive layouts	—	x	—	—	—	—	—
Cutting machines	—	—	—	—	—	—	x
stencils	—	—	—	—	—	x	—
paper	—	—	—	—	—	—	x
Cylinder presses	—	—	x	—	—	—	—
Design of type	—	x	—	—	—	—	—
Die cutting	—	—	x	—	—	—	—
Display composition	x	x	—	—	—	—	—
Drilling paper (punching)	—	—	—	—	—	—	x
Dummy (collection of layouts)	—	x	—	—	—	—	—
Duplicate printing plates	—	—	—	—	x	—	—
Duplicating machines	—	—	—	x	—	—	—
Electrotyping	—	—	—	—	x	—	—
Embossing	—	—	x	—	—	—	x
Engraving—copper and steel plate	—	—	—	—	x	—	—
wax plate	—	—	—	—	x	—	—
Families of type	x	x	—	—	—	—	—
Folding machines	—	—	—	—	—	—	x
Fonts of type	x	x	—	—	—	—	—
Furniture (as spacing material)	x	—	—	—	—	—	—
Gather signatures	—	—	—	—	—	—	x
Gold stamping	—	—	—	—	—	—	x
Grain of paper	—	x	x	—	—	—	x
Gravure	—	—	—	—	x	—	—
Gumming	—	—	—	—	—	—	x
Halftones	—	x	—	x	x	—	—
Harmony	—	x	—	—	—	—	—
Imposition of forms	x	x	—	—	—	—	x

<i>LEARNING UNITS</i>	<i>Composition</i>	<i>Layout and Design</i>	<i>Presswork</i>	<i>Offset-Lithography</i>	<i>Platemaking</i>	<i>Silk Screen</i>	<i>Bindery</i>
Intaglio printing	---	---	---	---	x	---	---
Italic type faces	x	x	---	---	---	---	---
Kluge press	---	---	x	---	---	---	---
Layout man's duties	---	x	---	---	---	---	---
Letter designs	---	x	---	---	---	---	---
Letterpress printing	x	---	x	---	---	---	x
Line engravings	---	---	---	---	x	---	---
Line up and register tables	---	---	x	---	---	---	---
Linotype and intertype machines	x	---	---	---	---	---	---
Ludlow typograph machines	x	---	---	---	---	---	---
Matrices							
Linotype and intertype	x	---	---	---	---	---	---
Stereotype	---	---	---	---	x	---	---
Measurements, point system of type	x	x	---	---	---	---	---
Mechanical bindings (spiral, plastic, etc.) ...	---	---	---	---	---	---	x
Monotype machines	x	---	---	---	---	---	---
Multilith Duplicator	---	---	---	x	---	---	---
Negatives	---	---	---	x	---	---	---
Numbering machines	x	---	---	---	---	---	---
Offset plates	---	---	---	x	---	---	---
Origin or history of							
Bindery work	---	---	---	---	---	---	x
Composition of type	x	---	---	---	---	---	---
Copperplate engraving	---	---	---	---	x	---	---
Electrotyping	---	---	---	---	x	---	---
Gravure	---	---	---	---	x	---	---
Offset-Lithography	---	---	---	x	---	---	---
Paper	---	---	---	---	---	---	x
Photogelatin (collotype)	---	---	---	---	x	---	---
Platemaking	---	---	---	---	x	---	---
Presswork	---	---	x	---	---	---	---
Printing ink	---	---	x	---	---	---	---
Silk screen printing	---	---	---	---	---	x	---
Type faces	x	x	---	---	---	---	---
Paper	---	x	---	---	---	---	x
Patent base	---	---	x	---	---	---	---
Pen ruling	---	---	---	---	---	---	x
Perfect binding	---	---	---	---	---	---	x
Perforating	---	---	x	---	---	---	x
Photoengravings	---	---	---	---	x	---	---
Photographic stencils for silk screen	---	---	---	---	---	x	---

<i>LEARNING UNITS</i>	<i>Composition</i>	<i>Layout and Design</i>	<i>Presswork</i>	<i>Offset-Lithography</i>	<i>Platemaking</i>	<i>Silk Screen</i>	<i>Bindery</i>
Plastic binding	---	---	---	---	---	---	x
Point system	x	x	---	---	---	---	---
Positive films	---	---	---	x	---	---	---
Premakeready	---	---	x	---	---	---	---
Presses, kinds of	---	---	x	---	---	---	---
Process color printing	---	---	x	---	---	---	---
Proofreading	x	---	---	---	---	---	---
Proportion	---	x	---	---	---	---	---
Raised letter printing (thermography)	---	---	x	---	---	---	---
Register	---	---	x	---	---	---	---
Reproduction proofs	x	---	---	x	---	---	---
Reverse plates	---	x	---	---	x	---	---
Rotary presses	---	---	x	---	---	---	---
Saws, printing	x	---	---	---	x	---	---
Screens, halftone and tints	---	x	---	---	x	---	---
Squeecgee	---	---	---	---	---	x	---
Stamping, foil, and blind	---	---	---	---	---	---	x
Stereotyping	---	---	---	---	x	---	---
Stitchers	---	---	---	---	---	---	x
Tint blocks	---	x	x	---	---	---	---
Type							
Cases	x	---	---	---	---	---	---
Classification of faces	---	x	---	---	---	---	---
Early type faces	---	x	---	---	---	---	---
Sizes of	x	x	---	---	---	---	---
Families	x	x	---	---	---	---	---
Fonts	x	x	---	---	---	---	---
Origin of	---	x	---	---	---	---	---
Parts of	x	---	---	---	---	---	---
Recognition of	x	x	---	---	---	---	---
Sizes	x	x	---	---	---	---	---
Vari-Typer (IBM, Justowriter, etc.)	x	x	---	---	---	---	---
Wage scales	x	---	x	x	x	x	x
Watermarks on paper	---	x	x	---	---	---	x
Wax engravings	---	---	---	---	x	---	---
Web presses	---	---	x	---	---	---	---
Zinc etchings	---	---	---	---	x	---	---

					
0%	10%	20%	30%	40%	50%

4 Organization of Instruction

INSTRUCTIONAL MATERIAL AND DEVICES

IN THE GRAPHIC ARTS, as well as in other areas of instruction in Industrial Arts education, shop projects are the objects around which the instruction is built—they teach what a boy or girl should know, and what he or she should be able to do.

Project Selection

Beginning projects should have a small number of basic learning units, selected by the teacher and required of all pupils as standard jobs. Such assignments are necessary in order to get the class under way without delay and confusion. Subsequent projects should include new learning units and should provide practice in the old. As pupils advance in knowledge and skills, they should be permitted to select their own projects with the advice of the teacher. Pupils should choose from a group of approved projects after they have mastered fundamental tool and machine processes and have acquired sufficient experience to make wise selections. Final approval of the selection should rest with the teacher.

In order to conform to standards, all projects should:

1. Contain most of the learning units desired
2. Be simple enough to be in the range of the pupil's ability, yet difficult enough to challenge his resourcefulness
3. Be of such nature that they can be handled under school shop conditions
4. Embody good design and have some intrinsic value to the home, school, or community
5. Be of such character that they can be completed within a reasonable or specified time
6. Have value in the pupil's estimation

A FEW SUGGESTED PROJECTS IN GRAPHIC ARTS

For Grades 7, 8 and 9

Showing Page Reference Notations

GRADE	PROJECT	THINGS TO KNOW	THINGS TO DO
7th	Setting paragraphs	A9-36; 100-121; B123-182; C123-127	Set straight matter A9-36; B138-150; C26-50; D28-34, 52-69
	Setting indentions	A30-34; B142-144; C79-82	Make layout A62-67; B65-85; C144-146; D95-99
8th	Calling card	A73-75; B77-84; C233-236; D122	Set display and tie up A51-70; B138-150; C175-192; D73-94
	Bookmark	A252	Proof and correct A37-42; B189-196; C55-60, 83-87; D35-41
	Shipping tag	A78-79	Lock up for press A123-130; B197-200; C88-98
	Class schedule	A46-50, 96-99; C132-137	Figure and cut paper A195-200; B287-294; C206-211; D224-225
	Letterhead	A72-73; C224-229; D116-117	Prepare press A135; B262-264
	Envelope	A70-71; C230-233; D118-121	Makeready press A135-138; B256-268; C111-114; D180-184
	Ticket	A76-78; C222-223; D103-106	Pressfeed A138; B269-270; C115-117; D184-185
	Package label	A79-80; D132-133	Clean press A139; B270; C109; D179-180
	Menu	A181-182; C108-109	Distribute type A44-45; B147-148; C61-64; D41-43

NOTE: A, B, C and D refer to books used by the class for these projects; figures following refer to page numbers in these books. List of "Things to Do" is common to all projects in composition, press, and bindery subareas.

GRADE	PROJECT	THINGS TO KNOW	THINGS TO DO
9th	Greeting card	A87-89	See page 14
	Bookplate	A95-96	
	Announcement	A85-87	
	Poster	A89-91	
	Program	A82-83; C247-254; D106-108	
	Handbill	A83-84; D110-111	
	Advertisement	A91-93; C237-246; D112-115	
	Title page	A93-95; C255-262; D136-137	

Teacher Job Plan

The teacher should carefully analyze each selected project, making a list of the learning units and a list of the best sequence of operations. Such an analysis should contain page reference to books, information sheets, study guides, and other helpful resources. Points at which the work will be checked by the teacher should be indicated.

Job Assignments

After the above analyses have been made, a job assignment can be given for each project, as illustrated on page 22. Ordinarily, this would include the following items:

1. A sample of the project. For example, a calling card, a Christmas card, a letterhead and envelope, or a family package label.
2. A list of the learning units with page references to book or study guides.
3. A pupil's job plan form on which the pupil is to make out his job plan and layout before starting the project. See page 23.

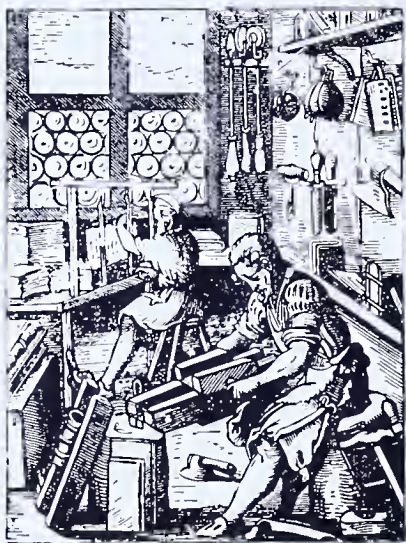
Sample Information Sheet and Operation Sheet

The *information sheet* on pages 16 to 18 is a sample of needed instructional material which the teacher can either prepare himself or secure in various forms from publishers (see annotated bibliography, pages 28-34). The *sample operation sheet* shown on pages 19 to 21 illustrates a type of instructional device needed in busy comprehensive general shops where pupils need such devices to supplement the teacher guidance.

SAMPLE INFORMATION SHEET for Graphic Arts

UNIT 11. HOW BOOKS ARE BOUND

LONG BEFORE books were bound in the way we see them now, the Egyptians, about 6,000 years ago, wrote their strange characters on parchment, and rolled the long skins, which were fastened together, into rolls often 18 feet long. The binding of books is, of course, much older than printing by any method, as the books copied by hand by the monks in the monasteries were done many years before Johannes Gutenberg printed the first Bibles. Then, and even sometimes now, books were bound by hand methods. Your schoolbooks and novels are bound by machines, which make them cheaper for us to buy than if hand bound.

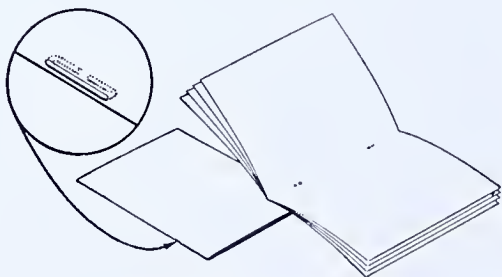


An Ancient Bookbinder at Work

How Sheets of Paper are Fastened

When we have printed matter larger than four pages (which is just a single piece of paper folded in the middle to make four leaves) we must use some method for fastening the various sections or *signatures* of the book together. This is called *pamphlet binding*. Binding methods are *saddle wire*, *side wire*, *loose leaf*, *soft-cover sewn*, *case-bound*, and *mechanically bound*.

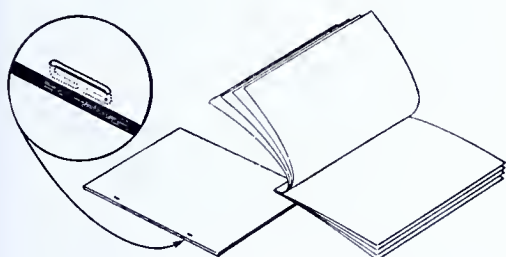
Saddle-Wire Binding. For a few pages, and often for many when the pages are made of thin paper, the saddle-wire type of binding is used. This can be done with a simple hand *stapler*, although in big printing houses this binding is done automatically on great, long machines that gather the folded sheets and carry them along a conveyor which has a stapling unit at the



Saddle-Wire Binding

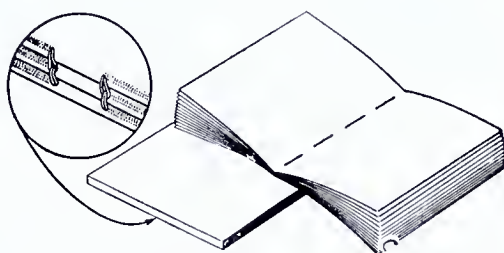
end. Saddle-wired books lie flat when open, and may be folded upon themselves. The inside or *gutter* margins close to the fold may be small. This is desirable in some cases. Many booklets are so bound.

Side-Wire Bindings. This method of fastening sheets together is so called because the sheets are stapled through at the left side. Big catalogs and magazines are often bound this way. Sometimes a cover is glued on the book after it is stapled. Odd-sized pages may be included, and usually such books are made up of single sheets that were printed at different times. One difficulty with a book bound in this way is that it will not readily stay open, and therefore is difficult to hold when reading. In this type of binding the *binding edge* needs to be wide.



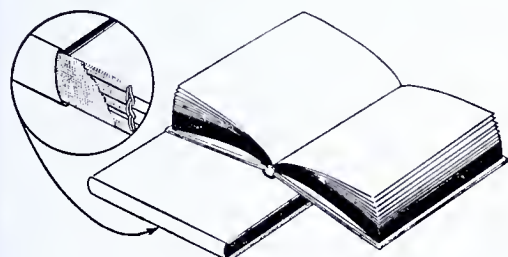
Side-Wire Binding

Sewn Soft-Cover. Perhaps you have in your collection of books some with soft paper or leather covers that are sewn, not wired together. These books are usually machine-sewn, but they may be hand-sewn, too. They lie open, so they are easy to hold to read. The gutter margin does not need to be very large.



Sewn Soft-Cover Binding

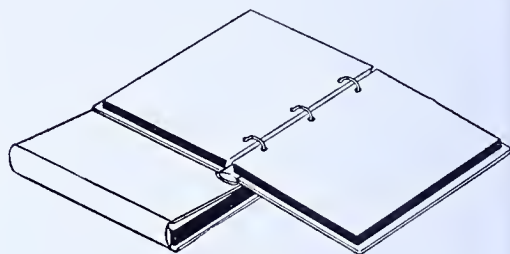
Sewn Case-Bound. This is the binding you are already familiar with, because most school books are so bound—in hard cardboard covers. The signatures are sewed, and the book is *rounded* at the back, which makes a concave part as you turn the pages. These books are bound in this way so that they will last a long time.



Sewn Case-Bound Binding

Loose Leaf Bindings. We are all familiar with the loose leaf bindings used in school. Some of them have two or more rings, which open like traps and hold the sheets in place. See Illustration on page 18. All the bookbinder does here is to *punch* holes where needed to fit the binding rings. Nowadays sheets for this kind of binding are *drilled*, perhaps as many as 500 at a time. The drill has a hollow *bit*.

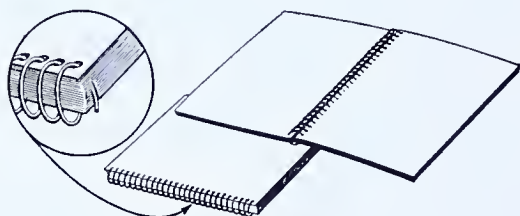
Mechanical Bindings. This is the very latest method of fastening book, catalog, and program pages together. Sheets of any odd size can be mechanically-bound by using a wiggle wire called *spiral* or a piece of plastic cut and bent into a cylindrical form, with tongues to hold the sheets. The spiral bindings can be folded over on themselves but the plastic bindings cannot. The plastic bindings are more sturdy, being stiffer than the spiral. Many styles are manufactured.



Ring Binding

TEST. Place the letter of the correct answer (a, b, or c) on the answer sheet provided.

1. The simplest and cheapest form of binding is (a) side-wire, (b) saddle-wire, (c) sewn case-bound.



Spiral Binding

2. Books which do not lie flat when open are (a) side-wire, (b) saddle-wire, (c) sewn case-bound.

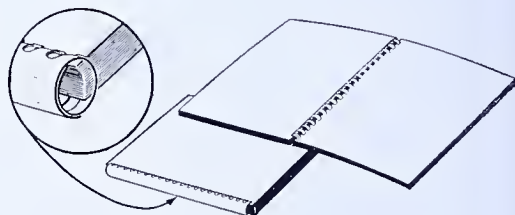
3. Odd-sized sheets can be bound easily in (a) saddle-wire, (b) sewn case-bound, (c) plastic.

4. Inside margins may be very small in (a) side-wire, (b) saddle-wire, (c) binding-post styles.

5. Books made to last a long time should be (a) sewn case-bound, (b) plastic bound, (c) saddle-wire bound.

6. Rounded books are possible in (a) saddle-wire, (b) side-wire, (c) case-bound.

7. Sheets may be added or removed in (a) ring binding, (b) case-bound, (c) spiral.



Plastic Binding

References

Perry, Kenneth and Baab, Clarence T., *The Binding of Books*. Peoria, Illinois. Charles A. Bennett Company.

Pratt, Guy A., *Let's Bind a Book*. Milwaukee, Wisconsin. Bruce Publishing Company.

Illustrations through the courtesy of *Industrial Arts and Vocational Education* magazine.

SAMPLE OPERATION SHEET

Operation Sheet No. 5

TO JUSTIFY A LINE OF TYPE

All lines of assembled type must be *justified* to hold them upright for printing. They are held together with other lines of type so they can be locked up in a frame called a *chase* and placed in the printing press.

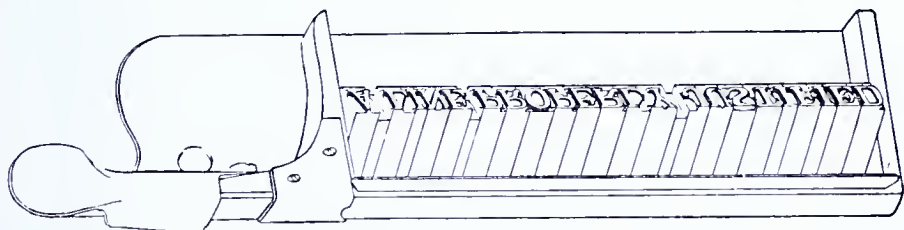


Figure 1. A line of type pushed up in the stick to prove it is justified

Justification of a line of type means putting in the required *spaces* and *quads* necessary to make the line stand alone in the *composing stick*. See Figure 1. (This is not *spacing* a line, which means increasing or decreasing the spaces between words to make the lines come out even on the right-hand ends, as explained in another operation sheet.)

What to Do

A. Set the composing stick.

The *stick*, in which type is set, is graduated in *picas* (a pica is about $\frac{1}{6}$ inch) and is adjustable in picas and half picas.

1. Lift the *clamp* of the stick. This allows the movable part (*knee*) to slide from left to right when it is lifted slightly. See Fig. 2, page 20.

2. Place the sliding part so that it is held at the 20-pica graduation. It will help to put a 20-pica *slug* in the stick.

3. Push the clamp down to lock the stick.

B. Set a line of type.

1. Hold the *stick* in the left hand (even if you are left-handed) as shown in Figure 2, page 20.

2. Place the first letter of your first name (in capitals) in the stick, *face* up and *nic*. up (see Figure 3, page 20) at the left of the stick and hold it there with your left thumb.

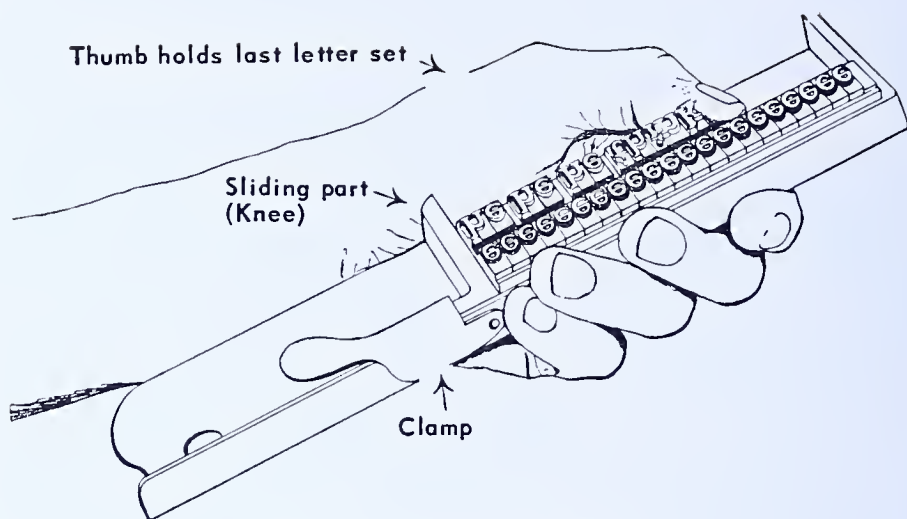


Figure 2. How to hold a composing stick

3. Place the second letter of your name in the stick by lifting your thumb, and then replacing your thumb to hold the two letters. Do not put spaces between letters; only between words.

4. Proceed through the spelling of your name, working from left to right (the type is upside down) and place an *en quad* between your first and last name.

5. You have space at the right end of the line; so place as many of the largest quads as you can at the end of the line. These may be *3-em* or *2-em quads*.

6. You no doubt still have some space in the line. Find the next largest quad (*em* or *en quad*) and place it between the last letter of your last name and the bigger quads. See Figure 4.

7. If the line is not yet tight enough to hold itself, find the next largest space (*3-em*, *4-em* or *5-em* space) and place it after the last letter of your last name.

8. To finally justify the line of type, you may need to make up a *combination* of spaces and quads which will make the line of type

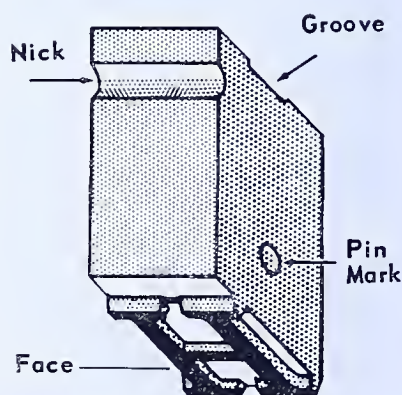


Figure 3. Parts of a type

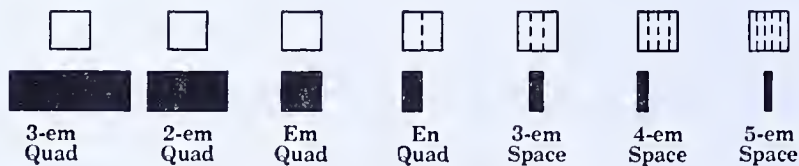


Figure 4. Sizes of spaces and quads

stand alone in the stick as shown in Figure 1. Figure 5 shows the order in which spaces and quads, and combinations of spaces and quads, make many varying thicknesses from the em quad down to the 5-em space.

9. Do not *force* spaces into the line, which will make the line *too tight* and also *break* spaces. When the line stands alone in the stick as shown in Figure 1, it is *justified*.

Thicknesses of Spaces and Quads and their Combinations

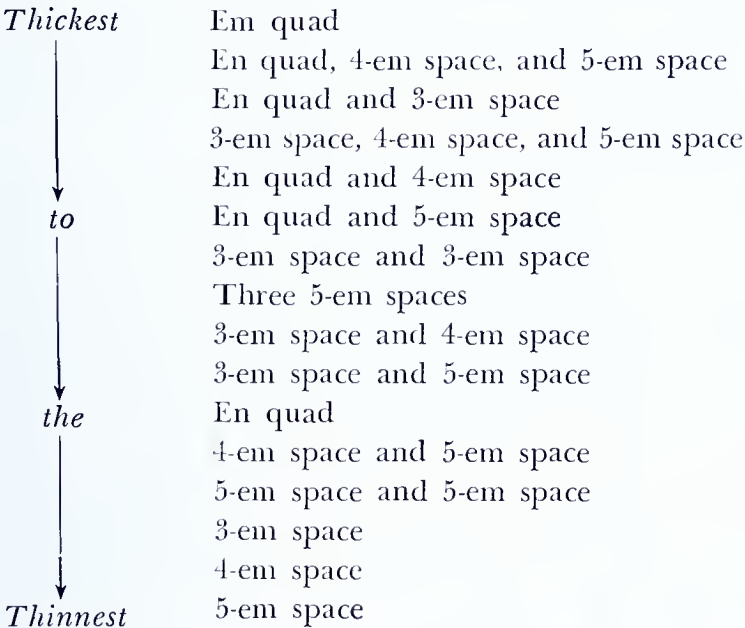


Figure 5. Thicknesses of spaces and quads and their combinations

Line-casting machine operator



SAMPLE JOB ASSIGNMENT

Project No. 8

TO PRINT A LETTERHEAD

Specifications: Fifty letterheads of selected and correct size. Copy—pupil's name and address and other suitable material as desired. Decoration may be used.

To be learned on this project: Needed copy for a letterhead, design of letterheads, practical sizes of letterheads, mechanics of laying out a letterhead, kinds of writing and bond papers and their sizes, methods of printing letterheads.

Additional practice in operations already learned: Composition of type, proofing and proofreading, locking up forms for the press, press makeready, feeding the press, washing the press, and distribution of type form. If done by lithography: imprinting the paper master plate from type-set form, setting up lithographic press, adjusting feeding mechanism, drawing or tracing any illustration on paper master plate.

<i>Procedure</i>	<i>Sources of Information</i>
A. Prepare the layout	(List references below) ¹
1. Prepare copy	a. _____
2. Determine size of letterhead	b. _____
3. Determine design	c. _____
B. Related Information	
1. Kinds of writing and bond papers	a. _____
2. Watermarks on papers	b. _____
3. Paper cutting and figuring	c. _____
4. Methods of printing letterheads	d. _____
a. Letterpress	e. _____
b. Copperplate engraving	f. _____
c. Raised letter printing	g. _____
d. Lithography	h. _____
(If lithography is not a part of activity)	

¹ "References below" refers to instruction sheets, operation sheets, job sheets, books or study guides used by pupils in the individual shop.

SAMPLE PUPIL JOB PLAN

Pupil's Name _____ *Grade* _____ *Section* _____

Project _____

Directions: Each pupil will make a layout, with type and margins specified, and list the principal steps he will take in doing this project, showing what he will do first, second, third, etc.

Steps of Procedure:

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.
- 9.
- 10.
- 11.
- 12.
- 13.
- 14.
- 15.

Layout (with specifications as to kind and size of type, width to be set, paper size of project, size of margins, etc.):

Shop Management Organization

As the activities presented in Industrial Arts shops are increased in number and scope, it is expedient for the teacher to assign some of the clerical, preparatory, maintenance, and routine duties to pupils. The pupil organization will vary according to the type of activity, size of the class, age of the pupils, and the physical layout of the shop.

Valuable experiences result from a good shop management organization, as commonly recognized by experienced Industrial Arts teachers. A few of the many values are:

1. Practice in leadership and followership
2. Development of responsibility and a feeling of belonging to the activity
3. Motivation of pupils' interest in industrial applications and operations
4. Assistance for the otherwise busy teacher in handling routine duties

In order to make any shop management organization successful, its importance, need, and practicability must be explained carefully to the pupils. The success of the program depends entirely upon the pupils' acceptance. The teacher should plan his presentation of the idea carefully in order to justify the value and need of such a program.

Because a teacher-imposed plan is readily recognized by the pupils, and has a tendency to lessen pupil interest, better cooperation can be developed through a personnel plan developed by the pupils with teacher guidance. A plan developed by the class or several classes motivates the pupils' interest in industrial personnel organizations, and a study of local plant systems by the pupils will be valuable in directing a well-organized plan for the school. The extra time spent in the democratic development of this plan is more than compensated by the added cooperation attained and the guidance value received by the pupils. A plan for setting up a shop management organization is given in Bulletin 331, *Industrial Arts in Pennsylvania*, September, 1951, Department of Public Instruction, on page 83.

Use of Records, Forms, Charts and Instructional Material

The Industrial Arts teacher of a comprehensive shop program is necessarily confronted with numerous problems that have to do with the organization of the program, details of instruction, and the handling of supplies. The number of problems increases as the activities in the shop become more diversified.

When shop work was first introduced into the public schools, teachers had a feeling that it provided a means of escape from the “drudgery” of books. Because of this, very little use was made of written materials. In recent years, through the need for help in the handling of more than one activity at one time, as well as the forward strides made in the writing and publishing of well-written material, Industrial Arts teachers have learned to use this material advantageously. Some of the advantages of this written material are as follows:

1. It gives the teacher more time to select instructional material, to arrange it in the best learning order, and to conduct large classes more effectively.
2. It makes more accurate instruction possible.
3. It places the responsibility on the pupil to seek out information.
4. It lends itself to accurate record keeping and checking.
5. It gives the teacher more time for individual attention to pupils.

Name	Grade	7	8	9	10	11	12	PG
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PUPIL CUMULATIVE PROJECT RECORD

Industrial Arts Department School _____ City _____

[illegible]

Sample of a Cumulative Project Record Form to be Kept Throughout a Pupil's School Experience in Graphic Arts.

Course

Grade

Section

Days

Periods

PROGRESS CHART

Semester

Year

Pupils' Names	Information Units					JOBS				

Sample Progress Chart to Show Accomplishment of Pupils Throughout the School Year.

Care should be taken that the teacher does not become so involved in the keeping of records that he actually becomes a clerk.

Arrangement and filing of instructional aids should be done by the pupils.

Teachers of graphic arts are encouraged to seek adequate instructional material covering not only the “Doing Units” but the “Knowing Units” as well. Adequate texts and study guides are listed in the annotated bibliography on pages 28 through 34. Information sheets may be prepared by the teachers of graphic arts. A suggested information sheet, “How Books are Bound,” on pages 16 to 18, indicates how such instructional material may be prepared.

Care in Use of Power Machines

It is suggested that power machines are not needed in the general shop to meet the graphic arts’ objectives. Hence, the platen letterpress printing machine would be of the hand-lever type. If lithography is added to the activities, it is well to get parental permission for the operation of an offset-lithographic office-type duplicator, since this machine is power-driven.

The only other hazard (no major hazards exist in the graphic arts area) is the paper cutter. A rigid rule should be set up, permitting only one pupil to operate a paper cutter of the hand-lever (non-powered) type. Rules for operating the cutter should be posted.

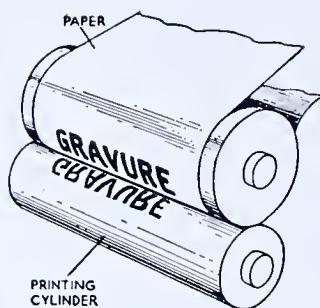
A PARTIAL CHECK LIST ON CARE OF THE SHOP

This check list may serve as a guide to the teacher in keeping the Graphic Arts area functioning in good order.

	Yes	No
1. A place for everything and everything in its place	_____	_____
2. Tools clean and in order, and placed in their respective places. A tool board is recommended	_____	_____
3. Tables and equipment well arranged	_____	_____
4. Press washed, rollers in correct place	_____	_____
5. Tables cleared of work and scraps	_____	_____
6. Bulletin board material changed frequently, and well arranged	_____	_____
7. Floor cleaned daily	_____	_____
8. Books, pamphlets, and layout materials kept clean and well arranged	_____	_____
9. Paper stock in orderly arrangement on shelves	_____	_____
10. Clean rags in proper receptacle	_____	_____
11. Gasoline-soaked rags in safety can	_____	_____
12. Type cases well arranged	_____	_____
13. Galleys clear of pied type	_____	_____
14. Out-of-way places dusted frequently	_____	_____
15. Project storage (standing type forms of projects) in good order	_____	_____
16. Machines oiled before use	_____	_____
17.	_____	_____
18.	_____	_____
19.	_____	_____
20.	_____	_____



**Platen
presswork**



5 Instructional Aids_____

BOOKS, MAGAZINES, FILMS

IN A BULLETIN of this size it is not possible to list all available materials in the form of books, pamphlets, study guides, charts, and catalogs. However, an attempt has been made to list some reference materials with publisher, date, number of pages, author, and annotation of the contents so that the Industrial Arts teacher will know what they contain.

BOOKS

American Type Founders, Department of Education, *Graphic Arts, the Foundation of a Liberal Education*. Elizabeth, New Jersey, American Type Founders, 1945, 16 pp., free

This booklet discusses the Industrial Arts' Graphic Arts program—its worth and importance, its cultural, guidance and consumer educational values, its place and function in modern secondary education, its power to shape and direct school and community cooperation. The book covers in detail graphic arts education in elementary, junior and senior high school, and college. It presents the school shop as a powerful publicity medium, and printing as a basic academic subject.

Caruzzi, Richard, *Offset Duplicator Techniques*. New York City, New York, Harold L. Taylor, 1948, 96 pp., \$3.50

Contents consist of an explanation of offset-lithography, line drawings, half-tones, combination plates, color printing by offset-lithography, offset chemistry, negatives, plates, paper and binding, "cold type" typography by IBM Electric typewriter, Vari-Typer, DSJ Coxhead Composing Machines, Fototype, etc., comprehensive layouts and photostats, how to operate the small offset duplicator, offset equipment, a discussion of press troubles, and a glossary.

Clark, Florence E., *Craftsmen in the Graphic Arts*. Scranton, Pennsylvania, International Textbook Company, 1950, 183 pp., \$3.00

This occupations book for the graphic arts contains the following bird's-eye view of the printing industry: the compositor who sets the type, the pressman who prints the forms and plates, the bookbinder who puts the book or pamphlet together and covers it, the stereotyper and the electrotyper who duplicate the

type forms and plates, the photoengraver and the lithographer who prepare plates containing illustrations and text, general information about workers, conditions that surround the printer at work, apprenticeship training in the field of the Graphic Arts, schools and other aids for training, and questions and problems. Appendices present references, associations, labor organizations, and questionnaires.

Clark, Merle A., *Applied Course for Student Printers*. Peoria, Illinois, Charles A. Bennett Company, 1949, 95 pp., \$2.68

Work problems are presented in this book, including 95 work sheets with suggested combination proof and grade sheets, with standards in time for completion. Special information sheets are provided.

Cleeton, Glen U., and Pitkin, Charles W., *General Printing*. Bloomington, Illinois, McKnight and McKnight Publishing Company, 1941, 167 pp., \$3.00

This book is divided into 112 units of work in letterpress printing, including simple type composition and platen presswork. Space is devoted to such matters as the development of printing, type and type-casting machines, paper, and printing inks.

Collins, A. F., *Book Crafts for Juniors*. Peoria, Illinois, Charles A. Bennett Company, 1942, 274 pp., \$4.25

This book deals with bookbinding for the teen-ager. The contents include such subjects as teacher problems, materials for simple book crafts, measuring, marking out and folding, cutting and trimming, pasting and pressing, sewing, piercing, punching and eyeletting, patterns, stick printing, edge stenciling, lettering, Christmas cards and calendars, folded paper construction.

Collins, A. F., *Book Crafts for Seniors*. Peoria, Illinois, Charles A. Bennett Company, 1942, 288 pp., \$4.50

Covers the same material as *Book Crafts for Juniors*, with additional information on block printing, designing, and decorating books of all kinds.

De Lopatecki, Eugene, *Advertising Layout and Typography*. New York City, New York, Ronald Press Company, 1935, 133 pp., \$3.50

How to follow a direct and logical plan for making layouts, with the principles of layout analyzed and demonstrated in the text. Includes definitions, four kinds of layouts, thumbnail sketches, design principles, contrast, balance, proportion, rhythm, how type is measured and calculated, identification of type faces, how to use type, display type, and hand lettering. It also explains the three basic formats: classic, editorial, and modernistic—visualizing the full-sized layout and revealing tricks of the trade.

Dunton, E. Burnham, *Career Opportunities in the Printing Industry*. Elizabeth, New Jersey, American Type Founders, 1950, 32 pp., free

Illustrated by graphs and charts, this book gives data on printing as a big business, employment opportunities (size of the industry and wages and hours), opportunities for advancement, the future of the printing industry, training opportunities in schools, jobs and qualifications necessary, occupations in relation to physical handicaps, and guidance questions and answers.

Eisenberg, James S., *Silk Screen Printing*. Bloomington, Illinois, McKnight and McKnight Publishing Company, 1952, 64 pp., \$1.50

This book covers silk screen printing by the five most popular methods: Tusche and glue, show-card color, gelatin transfer film, lacquer film stencil, and paper stencil.

Ettenberg, Eugene, *Type for Books and Advertising*. New York City, New York, D. Van Nostrand Company, 1947, 160 pp., \$6.00

Ten chapters concerning the tools of the typographer, type anatomy, and the four classes of type, type families, typographic niceties, recognizing type

faces, making type layouts, period typography (15th to the 19th century), masters of typography in the 20th century, opinions on type from 20 well-known type men, modern typography. A glossary of type face terminology is included.

Felten, Charles J., *Layout*. New York City, published by the author, 250 W. 57th St., New York 19, N. Y., 1949, 160 pp., \$6.00

This book, divided into eight parts, deals with the purposes and functions of typographical layout, scope of layouts, and layout styles; working materials and techniques, fundamentals of lettering, thumbnail sketches, roughs, and visuals; analysis of the copy, choice of layout style, evaluation of display importance; basic design requisites; allotment of white space, positioning the trade mark, ornamentation, reverse backgrounds, toned areas; photography, retouching, art, cropping and positioning photographs, hand lettering, reproduction proofs, photoengraving; a short study of types, fitting copy to areas, utilizing typographic material; choosing paper stock, color, marking layout and copy, deciding on practicability and flexibility.

Groneman, Chris H., *General Bookbinding*. Bloomington, Illinois, McKnight and McKnight Publishing Company, 1946, 64 pp., \$1.20

This illustrated book for the novice may be used in the junior and senior high school shop. The contents: a brief history of bookbinding; tools and equipment used; materials and supplies needed. Projects described: binding memo pad, autograph booklet, photo album, photo folder, loose sheets into book form, binding magazines into book form, and rebinding an old book.

Hague, C. W., *Printing for the Schools*. Milwaukee, Wisconsin, Bruce Publishing Company, 1943, 273 pp., \$2.50

This book is divided into three parts: elementary printing, advanced printing, and related information. Part I: type and composing equipment, setting type, handling and tying up forms, proofing and proofreading, cleaning and correcting type forms, distributing type, lock-up, operation of the platen press, and paper cutting. Part II: Display types, selecting the type for the job, fundamentals of design, use of borders and ornaments, preparation and use of layouts, typical display forms, composing color forms, tabular composition, printing the school newspaper, linoleum blocks, silk screen printing and special platen press operations. Part III: history of printing, how paper is made, kinds and use of paper, inks, plates machinery, office style of composition, and printshop mathematics.

Hague, C. W., *Printing Job Sheets*. Milwaukee, Wisconsin, Bruce Publishing Company, 1934 and 1935, loose job and operation sheets, Set No. 1, \$.70, Set No. 2, \$.70

A series of job sheets, unbound. Comes in two sets. Set No. 1 contains simple typesetting, elementary composition, setting poetry, justification for lines of type, indentions, numbered paragraphs, outlines, punctuation, initial letters, leaders, rules, column alignments, rule borders, and type borders. Set No. 2 includes layouts, make-up, forms, tickets, programs and menus, posters, checks and receipts, title pages, cards, letterheads, envelopes, statements, advertisements, tabular forms, two-color work, and notebook covers. Each set has a series of operation sheets.

Herold, Don, *ATA Advertising Production Handbook*. New York City, New York, Advertising Typographers Association of America, 1947, 71 pp., \$2.50

This book is intended for buyers of advertising typesetting service, and includes sections on the mechanics of typography, how to make printing easy to read, fitting type to copy, characteristics of type faces, layouts, saving money on typography, paper and paper sizes, photoengravings, how to save money, and how to get the best results in engraving and electrotyping.

Hewitt-Bates, J. S., *Bookbinding for Schools*. Peoria, Illinois, Charles A. Bennett Company, 1946, 128 pp., \$3.25

A book stressing such special processes and effects in bookbinding as marbling, edge-gilding, gold tooling, graining and staining end papers, and designing covers.

Hoch, Fred W., *Handbook for Pressmen*. New York City, New York, Fred W. Hoch Associates, Inc., 1946, 236 pp., \$3.50

A technical discussion, valuable to the teacher as a reference to the following: methods of line-up, presswork, makeready on all kinds of presses, printing water color, setting rollers, work-ups, wrinkles, slurs, plate repairs, blocking out, patent base, cellophane printing, embossing, die-cutting, ink, color mixing and matching, metallic inks, facsimile letters, etc.

Hunter, Dard, *Paper-Making in the Classroom*. Peoria, Illinois, Charles A. Bennett Company, 1931, 80 pp., \$1.35

This book illustrates how paper can be made in the classroom, how the first paper was made, and papermaking for amateurs. Chapter IV describes papermaking from rags, beating the material, tools involved, the mold and deckle, forming sheets of paper in the mold, sizing, coloring, watermarking, and making the watermark.

Jahn, Hugo, *Hand Composition*. New York City, New York, John Wiley & Sons, 1931, 341 pp., \$4.50

This is a treatise on the trade and practice of the compositor and printer. It covers pre-typographic writing symbols, materials, books, block prints and block books, the invention of typography, type cases, compositor's tools, proof presses, characteristics of printing types, names and sizes of type, composition, distribution, printer's proofs, point system, tabular composition, cabinets and kindred equipment, lock-up, stonework and imposition, book composition and make-up, the development of paper-manufacturing processes, and a glossary of terms.

Karch, R. Randolph, *Basic Lessons in Printing Layout*. Milwaukee, Wisconsin, Bruce Publishing Company, 1952, 140 pp., \$1.96.

An elementary work written for junior and senior high school planning areas in the graphic arts. The book has 46 self-assigning units covering typographic design, display composition, correct spacing, and how to copyfit manuscript. A problems and projects section presents 208 objective-type questions to be completed by the pupil in small units. Thirty-four layout assignments are illustrated and keyed to the book. "Clipping assignments" give pupils experience in collecting typographic specimens.

Karch, R. Randolph, *Graphic Arts Procedures*. Chicago, Illinois, American Technical Society, 1951, 384 pp., \$3.75

Fourteen chapters divided into 60 learning units in the graphic arts. Objective tests follow each chapter. The contents: how to understand the printing processes, how to know the various type faces, how to make layouts, how to set type, how to prepare copy and proofread, how to lock up and impose pages, how to understand letterpress printing plates, how to do offset-lithographic printing, how to understand the gravure and photogelatin processes, how to do letterpress presswork, how to know paper, how to understand bindery work, how to get a job in the graphic arts, and how to understand graphic arts terms. Safety hints follow each chapter. A complete copyfitting system is built into the book. Study guide is available.

Karch, R. Randolph, *Study Guide for Graphic Arts Procedures*. Chicago, Illinois, American Technical Society, 131 pp., 1949, \$1.50

The content of *Graphic Arts Procedures* is broken down into small, easily learned units with "self-check" quizzes followed by comprehensive objective tests covering each chapter.

Karch, R. Randolph, *How to Plan and Buy Printing*. New York City, New York, Prentice-Hall, Inc., 1950, 169 pp., \$5.65

A book stressing the "how to get" factors for the non-technical buyer of printing. Content: how to prepare copy, how to prepare illustrations and order engravings and duplicate plates, how to understand type composition, how to select body types, how to distinguish body types, how to select display types, how to specify type and proofreader's corrections, how to understand type measurements, how to copyfit, how to recognize sans serif and square serif type faces, how to understand the graphic arts processes, how to plan booklets and mailing pieces, how to select paper stock, how to bind the book, and an explanation of graphic arts terms.

Karch, R. Randolph, *How to Recognize Type Faces*. Bloomington, Illinois, McKnight & McKnight Publishing Company, 1952, 265 pp., \$6.00.

A reference book presenting a recognized system for the almost 1,500 type faces in use in the United States at the present time. Type faces, in representative characters, are arranged in order of their similarities, and cross-indexed for ease in study.

Karch, R. Randolph, *Printing and the Allied Trades*. New York City, New York, Pitman Publishing Corporation, 1939, 310 pp., \$3.00

Content consists of a brief history of printing contrasted with present methods in regard to type, spacing materials, how to set straight matter and display matter from layouts, proof, proofreading, distribution of type, and the composition of common commercial jobs. Included also is information on typesetting machines, lock-up and imposition, printing plates, ink, use of color and ink, lithography and gravure, collotype, accident and health hazards, and samples of type faces. There are thirteen pages of exercises and problems, keyed to the text, and eighteen pages of projects in printing for pupils. Objective tests, with grading tables, throughout the book are keyed to the text matter. A glossary of printing terms is provided.

Kaufmann, Desiré, *Graphic Arts Crafts*. New York City, New York, D. Van Nostrand Company, 1948, 244 pp., \$2.75

Covers linoleum block printing, wood engraving, etching, silk screen printing, lithography, bookbinding, and letterpress printing. Illustrations show how the various processes are performed in the school shop.

Kosloff, Albert, *Elementary Silk Screen Printing*. Chicago, Illinois, Naz-Dar Company, 1946, 40 pp., \$1.75

A clear explanation of the principle of silk screen printing, the printing frame and how to make it, the squeegee, silk screen paints, screen preparation, kinds of stencils used, how to prepare a knife-cut lacquer stencil, preparing a screen by the block-out method, lettering-on or Tusche methods, photographic stencils, preparing photographic stencils directly on the screen, preparing a photographic-transfer stencil, and the materials and equipment needed for silk screen printing.

Lasky, Joseph, *Proofreading and Copy-Preparation*. New York City, New York, Mentor Press, 1941, 656 pp., \$7.50

A reference book that answers most of the problems in style and grammar. It includes the history and development of proofreading, marks used, practical work of proofreading, organization of the proofroom, qualifications and duties of the copyholder, preparation of copy for the printer, compounding of English words, modern punctuation, capitalization, uses of italics, division of words into syllables, foreign words, elements of typography, abbreviations, contractions, foreign phrases, homonyms, errors in sentence structure, and vocabulary usage.

Lush, Clifford K., *Junior Printing*. Peoria, Illinois, Charles A. Bennett Company, 1943, 64 pp., \$1.20

This book for the junior high school shop presents: learning the type case, setting straight matter composition, locking up a form, printing paper, platen presswork, and typical projects.

Marinaccio, Anthony, and Osborn, Burl Neff, *Exploring the Graphic Arts*. Scranton, Pennsylvania, International Textbook Company, 1942, 274 pp., \$2.50

This book, which is exceptionally well printed and designed, includes the following subject matter: man and his records, letterpress printing, relief cuts for letterpress printing, intaglio printing, planography, and other printing processes. It also describes paper and papermaking, ink and ink making, silk screen, the binding of books, and their care and use. An appendix presents the physical plan and equipment for a graphic arts laboratory to teach the above course content.

Palmer, E. W., *A Course in Bookbinding for Vocational Training*. Kingsport, Tennessee, Kingsport Press, 1950, 451 pp., \$3.00

This book lists the equipment and supplies required for a vocational class of 24 pupils. In 25 lessons paper of all kinds, covers, scrapbook building, glues, easels, book cloth, loose-leaf cover making, work in leather bindings, forwarding, casing, and other pertinent topics are discussed. The projects for students include such assignments as testing paper, preparing signatures, cutting and fitting book covers, lacing, stitching and tying, use of paste, making photo albums, desk blotters, or spectacle cases. The elementary section applies to Industrial Arts work.

Perry, Kenneth F. and Baab, Clarence T., *The Binding of Books*. Peoria, Illinois, Charles A. Bennett Company, 1940, 160 pp., \$3.25

A complete text on the methods, equipment, tools, and processes involved in the making of books and their repairs. Contents: tools and equipment, materials and supplies, problems of binding, and projects.

Polk, Ralph W., *Elementary Platen Presswork*. Peoria, Illinois, Charles A. Bennett Company, 1931, 148 pp., \$2.48

Has to do with all necessary operations of setting up the press for operation, and simple platen press makeready. Historical presses, kinds of presses other than platen, care of rollers, inks, handling paper, work-and-turn and work-and-twist forms, halftone printing, linoleum block printing, and special operations, such as numbering, are also explained.

Polk, Ralph W., *Essentials of Linoleum Block Printing*. Peoria, Illinois, Charles A. Bennett Company, 1927, 60 pp., \$1.45

A brief history of block printing and its origin; adapting the design to linoleum, transferring the design to the block, engraving the block, and printing the block. The commercial uses of linoleum blocks, and suggested equipment for teaching this area of Graphic Arts.

Polk, Ralph W., *The Practice of Printing*. Peoria, Illinois, Charles A. Bennett Company, 1945, 300 pp., \$3.50

Deals with such phases of the industry of printing as type, type cases, spacing material, how to set type, handling type forms, proofing and reading, distribution, the point system, lock-up, platen presswork, and makeready. The linotype and monotype machines are explained, as well as brass rules, tabular matter, use of layouts, borders, type and its legibility, display, balance, proportion, shape and tone harmony, decoration, initial letters, paper, color, composition of tickets, stationery, advertisements, programs, cover, title and book pages, plates, and linoleum block printing. It contains a glossary.

Polk, Ralph W., *Elementary Printing Job Sheets*. Peoria, Illinois, Charles A. Bennett Company, 1939, 61 pp., \$1.20

This loose-leaf workbook is to be used with *The Practice of Printing*. It is a series of exercises in type composition of various kinds, with questions to answer for grading.

Pratt, Guy A., *Let's Bind a Book*. Milwaukee, Wisconsin, Bruce Publishing Company, 1940, 137 pp., \$2.00

Line illustrations explain the following content: equipment for bookbinding, constructing loose-leaf bindings, preparations for book sewing, sewing on tapes, constructing book covers, finishing the cover, casing-in the book, sewing a book on cords, care and repair of books, marbling book edges and end sheets, gilding the edges of books, miscellaneous bindings, binding pamphlets, the bookbinding industry of the country, and a glossary of bookbinding terms.

Simon, Oliver, *Introduction to Typography*. Cambridge, Massachusetts, Harvard University Press, 1945, 137 pp., \$3.00

This book of British origin contains the following: foundations of typography, rules of composition, choosing the type face, setting of the text, the preliminary pages, appendix, author's notes, glossary, bibliography, index, illustration, paper, presswork, binding, jackets, and miscellaneous information.

Stevens, William J., and McKinven, John A., *How to Prepare Art and Copy for Offset Lithography*. Maywood, New Jersey, Dorval Publishing Company, 1948, 107 pp., \$5.25

A technical although easily understood book for the buyers of offset-lithography. Content: an introduction to lithography, before art and copy begin, designing for lithography, planning photography for better reproduction, retouching photographic prints, type proofs for lithography, preparing "line" art illustrations and lettering, getting the most out of tones in art work, assembling the parts—the "pasting up," art for color processes, and a glossary.

United States Government Printing Office, *Typography and Design*. Apprentice Training Series, Intermediate Period, Washington, D. C., United States Government Printing Office, 1951, 187 pp., \$1.25

Twenty-four lectures planned to give an outline of this subject. The contents: introduction to typography and design, brief history of printing types, origin of contemporary faces, selection of type, legibility, kinds of copy, illustrations—halftone, line and color photographs—design principles, tools, determining the format, uses of illustrations, selecting the process, paper and binding, layouts, copyfitting, printing for the government—processes, classification, planning composition, presswork and binding. No illustrations.

Watson, Ernest W. and Kent, Norman (eds.), *The Relief Print*. New York City, New York, Watson-Guption Publications, 1945, 79 pp., \$4.50

Differentiation is made between the woodcut wood engraving, and linoleum cut. Tools, processes, and methods are graphically presented.

MAGAZINES AND TECHNICAL JOURNALS

Monthly journals devoted to the Graphic Arts field:

American Printer, The. Moore Publishing Co., 48 West 38th Street, New York 16, N. Y.

Bookbinding and Book Production. 50 Union Square, New York 3, N. Y.

Graphic Arts Monthly. 608 South Dearborn St., Chicago 5, Ill. Free to school shops

Inland Printer, The. 309 West Jackson Blvd., Chicago 6, Ill.

Modern Lithography. 254 West 31st St., New York 1, N. Y.

National Lithographer. 11 Park Place, New York 7, N. Y.

New England Printer and Publisher. 470 Atlantic Ave., Boston 10, Mass.

Printing Equipment Engineer. 1276 West Third Street, Cleveland 13, Ohio

Printing Magazine. 41 Park Row, New York 7, N. Y.

Western Printer and Lithographer. 3923 West 6th Street, Los Angeles, Calif.



**Plate-
making**

FILM SOURCES AND TITLES

Motion pictures, filmstrips, or filmslides, colored, sound, or silent, on Graphic Arts materials, processes, and methods are available free, for transportation charges, or for transportation charges and a small fee, as follows:

A Better Run for Your Money. The importance of printed salesmanship, what makes printed salesmanship effective, and the process of lithography. Harris-Seybold Company, 4510 East 71 Street, Cleveland, Ohio. 16 mm., sound, color. Free

Another Man's Business. The origin of the printing press. Miller Printing Machinery Company, 1101 Reedsdale Street, Pittsburgh 33, Pennsylvania. 16 mm., sound, color, 20 minutes. Free

A Short Course in Paper Making. Papermaking from wood-cutting operations to shipping the finished product to printers. P. H. Glatfelter Company, Spring Grove, Pennsylvania. 16 mm., sound, color. Transportation charged

Bindery Operations. Cutting, folding, stitching, case making, casing-in, and various machines in use in the modern bindery. Western Printing and Lithographic Company, 1220 Mound Avenue, Racine, Wisconsin. 16 mm., silent. Free

Book of Books, The. The production of Bibles. The National Bible Press, Film Loan Library, 239 South Market Street, Philadelphia, Pennsylvania. 16 mm. Transportation charged

Elementary Bookbinding. The design of a simple bookbinding and finger-painting decoration. Brandon Films, Inc., 1700 Broadway, New York City, New York. 16 mm., sound, \$2.50; 16 mm., silent, \$1.50

Five Centuries of Typefoundry. Shows and compares various type faces. Miss Lucille Ringgold, Modern Talking Picture Service, Inc., 45 Rockefeller Plaza, New York 20, New York. Give three choices of dates. 35 mm., filmstrip, sound, 30 minutes. Free

Graphic Arts March On, The. The development of color printing in the United States, and how ink is used in the various graphic arts processes. Sinclair & Valentine Company, 611 West 129 Street, New York City, New York. 16 mm., sound, color. Transportation charged

Heights and Depths. Basic principles of photoengraving, woodcuts, halftones, line plates, etc. Audio-Visual Education Center, University of Michigan, Ann Arbor, Michigan. 16 mm., sound. \$1.50

How to Make a Good Impression. A comparison of the processes of letterpress, lithography, and gravure, with emphasis on lithography of advertising. An advertising folder is carried through all phases of production. Harris-Seybold Company, 4510 East 71 Street, Cleveland, Ohio. 16 mm., sound, color. No charge

Magazine Magic. Everything from the planting of trees for wood pulp to the finished copies of the magazines printed by the Curtis Publishing Company, Princeton Film Center, Princeton, New Jersey. 16 mm., sound, color. Transportation charged

Making a Book. Papermaking, composition, electrotyping, photoengraving, presswork, bindery. Eastman Kodak Stores, Inc., 356 Madison Avenue, New York City, New York. 16 mm., silent. \$1.50. Transportation charged

Making of a 24-Sheet Poster, The. The entire story of the manufacturing of billboard posters from rough draft to color-lithographed sheets. McCandlish Lithograph Corporation, Roberts Avenue at Stokely Street, Philadelphia, Pennsylvania. 16 mm., silent. Transportation charged

Modern Lithographer. Direct and offset lithography, techniques of lithographic artists and photographers in art and advertising printing. Bureau of Visual Education, Lawrence, Kansas. 166 mm., sound. \$1.50

Operation and Maintenance of the Model 31 Linotype. Mergenthaler Linotype Company, Park Avenue and Ryerson Streets, Brooklyn 5, New York. 16 mm., sound, 20 minutes. Free

Paper. The process of making paper carefully explained. Audio-Visual Education Center, University of Michigan, Ann Arbor, Michigan. 16 mm., sound. \$1.00

Printing. Jobs of compositor, pressman, bindery man, layout man, linotype and monotype operators, proofreaders, with skills explained. Processes of letterpress and offset, including newspaper work, writing, art, and advertising. Bureau of Visual Education, Lawrence, Kansas. 16 mm., sound, one reel. \$1.50

Printing Occupations. Composition, linotype, monotype, photoengraving, plate-making, presswork, bindery. Audio-Visual Education Center, University of Michigan, Ann Arbor, Michigan. 35 mm., filmstrip No. 15, 60 frames and guide, three days. 40¢

Rainbows to Order. A tour through an ink manufacturing plant; the formulation of printing ink. International Printing Ink Corporation, Motion Picture Bureau, 636 11th Ave., New York City 19, New York. 16 mm., sound, color, 20 minutes. Transportation charged

Silk Screen Printing. Complete step-by-step process in silk screen printing. Library Films, Inc., 25 West 45 Street, New York City, New York. 16 mm., sound. Price \$60.00

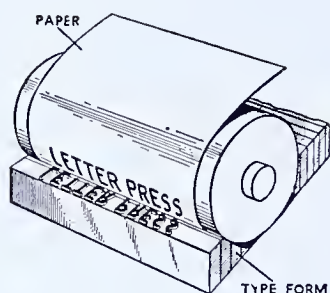
Simple Block Printing. The entire process of making block prints, including an explanation of the tools and methods used. Brandon Films, Inc., 1700 Broadway, New York City, New York. 16 mm., sound. \$2.50; 16 mm., silent, \$1.50

Technique of the Silk Screen Process. A demonstration of the entire process. Audio-Visual Education Center, University of Michigan, Ann Arbor, Michigan. 16 mm., silent. Rental \$1.00

Trees to Tribune. The production of a modern newspaper. The Chicago Tribune, Film Bureau, Public Service Office, Chicago, Illinois. 16 mm., technicolor. Transportation and insurance charged

Type Speaks. Type and its contribution to civilization. The drawing of new type faces and their manufacture, and type in use. Miss Lucille Ringgold, Modern Talking Picture Service, Inc., 45 Rockefeller Plaza, New York 20, New York. Give three choices of dates. 16 mm., sound, color. Free

Xerography. A new process of printing using electronics. The Haloid Co., 317 Widener Building, Philadelphia 7, Pennsylvania. 16 mm., sound, color. Free



6 *Equipment and Supplies*

MACHINERY AND SUPPLY LISTS

THIS SECTION SUGGESTS to the teacher of Industrial Art how to select equipment and consumable supplies, and how to order them. In addition, lists of equipment and supplies needed are presented for each area of the Graphic Arts unit.

The suggested lists of equipment, tools, and supplies are based on an enrollment of five pupils in the Industrial Arts Graphic Arts area of the comprehensive general shop. The lists may be changed to meet local needs.

How to Select Equipment

Several factors are to be considered in determining the quantity and type of equipment to be selected for the Graphic Arts area of the comprehensive general shop. Briefly, they are as follows:

1. The objectives to be attained through its use
2. The activities planned
3. The size of the class
4. Content and scope of the course
5. Whether used in junior or senior high school, or both
6. Funds available

How to Specify and Order Equipment and Supplies

After approval has been granted by the local board of education to purchase equipment, tools, and supplies for the Industrial Arts activity, specifications must be written. It is important that a detailed description be given for each tool or piece of equipment so that the quality desired may be obtained, and bidders on the materials may know that substitutions cannot be made.

Paper, equipment, and supply catalogs should be consulted so that when orders are written the supplier or bidder will know exactly what is wanted. It is not sufficient, for example, to say "a 6x9-inch hand-lever press," or "500 sheets of index bristol" or "a ream of bond paper." Specifications for such items should be written in the form suggested below:

1 No. 5 Sigwalt (or equal) Hand-Lever Printing Press, chase size 6x9 inches inside, with standard equipment including stirrup handle, two depressible grippers, wrench, single disc, two cast-iron chases, and two cast rollers.

500 sheets index bristol, white, $25\frac{1}{2} \times 30\frac{1}{2}$ —110, cut in half to $15\frac{1}{4} \times 25\frac{1}{2}$ inches.

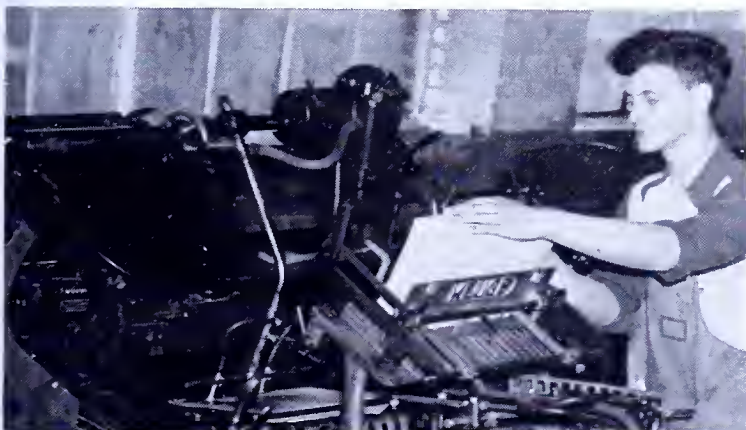
1 ream watermarked bond paper, white, bond finish, 50% rag content, 17x22—20.

How to Keep a Shop Inventory

Many different methods of keeping a shop inventory are used in Industrial Arts shops. The type used depends somewhat on the local school organization. In larger systems, methods of keeping inventories are set up by the administrative office. In smaller systems, however, the job of keeping inventory is usually the job of the individual teacher. The advantages of keeping an accurate inventory are so great that only a few of the more important ones are listed here. The inventory form:

1. Tells, at all times, the quantity of stock and supplies on hand
2. Gives accurate information as to the amount that was used during the past year
3. Determines the amount needed for the next year
4. Justifies quantities on requisitions to the superintendent and board of education.

A suggested shop inventory form is shown on page 40.



**Automatic
presswork**

INVENTORY

Shop *General*

Area *Graphic Arts*

On Hand		Description	To Be Ordered	Cost	
Start of Year	End of Year			Each	Total
<i>1 bundle</i>	<i>0</i>	<i>Binders' board, 23x28 No. 18</i>	<i>1 bundle</i>	<i>5.85</i>	<i>5.85</i>
<i>1 roll</i>	<i>¼ roll</i>	<i>Tympan paper, 12 inch</i>	<i>1 roll</i>	<i>9.90</i>	<i>9.90</i>
<i>2 pints</i>	<i>¼ pint</i>	<i>Sphinx Makeready Paste</i>	<i>2 pints</i>	<i>.70</i>	<i>1.40</i>
<i>1 quart</i>	<i>0</i>	<i>Red cold padding glue</i>	<i>1 quart</i>	<i>2.00</i>	<i>2.00</i>
<i>1 gallon</i>	<i>0</i>	<i>Type cleaner</i>	<i>1 gallon</i>	<i>3.00</i>	<i>3.00</i>
<i>1 roll</i>	<i>½ roll</i>	<i>Gummed cloth tape, black, 450 foot roll, 2 inch width</i>	<i>1 roll</i>	<i>4.80</i>	<i>4.80</i>
<i>1 dozen</i>	<i>¼ dozen</i>	<i>No. 2 McGill Spring Tongue Gauge Pins</i>	<i>1 dozen</i>	<i>1.80</i>	<i>1.80</i>
<i>1000</i>	<i>100</i>	<i>No. 88 Bristol cards, white vellum, 22½x28½ -240, 2x3½</i>	<i>1000</i>	<i>1.91</i>	<i>1.91</i>
<i>2000 sheets</i>	<i>300</i>	<i>White vellum bond, 17x22-40(M)</i>	<i>2000 sheets</i>	<i>11.62</i>	<i>23.22</i>

TOOL, OTHER EQUIPMENT, AND MACHINERY LIST

The kind and amount of equipment selected for any shop activity depend mainly on the size of the class, the grade level of the pupils, and the type of activity to be taught. Equipment is usually considered to be machines, tools, and auxiliary aids that are not consumed in the finished product.

The tools, other equipment, and supplies recommended in this bulletin are based on the minimum requirements in the Graphic Arts for five pupils in a comprehensive general shop. If offset lithography is added to the Graphic Arts area, it is feasible to have six pupils working in the area at one time.

A larger number of pupils may be accommodated by increasing the equipment proportionately. The cost of tools and equipment given

in this bulletin is as of July 1, 1951, and is subject to fluctuation. Because consumable supplies are similar in nature to such items normally purchased by established schools, no prices are given for them.

It should not be taken for granted that any brand names mentioned are recommended over others of equal or better quality, but are given only to illustrate needed materials and equipment.

Layout Area

As the layout area for Graphic Arts might well be in the general planning area of the comprehensive general shop, with the exception of the printer's line gauges, items of the following list will already be a part of the equipment. However, this material should always be provided for the pupils in the Graphic Arts area.

2	12x18-inch	Drawing boards.
2	18-inch	T-squares.
2	45° angle	Triangles.
2	30° and 60° angle	Triangles.
2		Printer's line gauges, with pica and inch divisions.

Composition Area¹

- 2 school-type Type Cabinets, each with a two-sided working bank top, double lead and slug cases over top, and single-tier body containing one blank case, two Wells job cases and 13 California job cases with steel shoes, Prestwood Masonite bottoms, and combination pull and label holders. Wood construction. \$176.50 each \$353.00
- 1 No. 0 ATF-Vandercook Proof Press, or equal or better, complete with cabinet and brayer \$251.00
- 5 series of type with spacing material as follows²:

<i>Quantity</i>	<i>Style or Item</i>	<i>Size</i>
1 font	Garamond	8 point
2 quantity fonts	Garamond	10 point
1 font	Garamond	12 point
1 font	Garamond Italic	8 point
1 font	Garamond Italic	10 point
1 font	Garamond Bold	10 point
1 font	Garamond Bold	12 point
1 font	Garamond Bold	14 point

¹ Prices are approximate and as of July, 1951; therefore they are subject to fluctuations.
² See Typefounders' catalogs for selecting type faces.

<i>Quantity</i>	<i>Style or Item</i>	<i>Size</i>
1 font	Garamond Bold	18 point
1 font	Garamond Bold	24 point
1 font	Garamond Bold	30 point
1 font	Garamond Bold	36 point
1 font	Brush	18 point
1 font	Brush	24 point
1 font	Brush	30 point
1 font	Light Copperplate Gothic	6 pt. #2
1 font	Light Copperplate Gothic	6 pt. #4
1 font	Light Copperplate Gothic	12 pt. #6
1 font	Light Copperplate Gothic	12 pt. #8
1 5-lb. pkg.	Spaces and Quads	6 point
1 5-lb. pkg.	Spaces and Quads	8 point
6 5-lb. pkgs.	Spaces and Quads	10 point
1 5-lb. pkg.	Spaces and Quads	12 point
1 5-lb. pkg.	Spaces and Quads	14 point
1 5-lb. pkg.	Spaces and Quads	18 point
1 5-lb. pkg.	Spaces and Quads	24 point
1 5-lb. pkg.	Spaces and Quads	30 point
1 5-lb. pkg.	Spaces and Quads	36 point
6 5-lb. pkgs.	Labor Saving Leads, 4 to 25 picas	2 point
10 5-lb. pkgs.	Labor Saving Slugs, 4 to 25 picas	6 point
1 No. 5 font	Labor Saving Brass Rule	2 point
1 set (4)	Brass Brazed Corners for rule above	
Total Cost		\$373.7

Tools and Supplies as follows:

- 1 pint-size benzine can
- 1 No. 1 benzine brush, oval back
- 2 semi-steel chases for Pilot hand-lever press
- 4 composing sticks, pica, 6x2 inches, stainless steel
- 1 composing stick, job, 10x2 inches, stainless steel

10 steel galleys, 8¾x13 inches, rustproof	
1 dozen spring tongue gauge pins	
1 tube (¼ pound) job black printing ink	
1 doz. No. 0 quoins	
1 quoin key for No. 0 quoins	
1 quarter-sized rule case	
1 mallet, 12 ounce	
1 proof planer, 3½x8 inches, with leather top	
1 midget type planer, 1¾x3 inches	
1 6-inch roller brayer, with cast roller	
1 set ATF Printing Instruction Charts, 24 visual aids, 14x11 inches, for instruction in composing room practice	
Total cost	\$75.00

Pressroom Area

1 hand-lever printing press, chase size 6½x10 inches inside, with straight handle, single disc, depressible grippers, one semi-steel chase, wrench, and two cast rollers ..	\$194.00
1 press and materials cabinet, with twelve sloping shelves for 8¾x13-inch galleys, one drawer with compartment for storing four rollers, one drying rack drawer, chase rack unit for five chases and two open bins for paper stock, one portable lock-up cabinet with compartments for storing one font of reglet and furniture, and one 12x18 marble surface	\$187.85
1 font reglet and furniture, 6 pieces each 6-point and 12-point reglet, four pieces each 2-, 3-, and 4-line and two pieces each 8- and 10-line furniture cut 10, 15, 20, 25, 30, 35, 40, and 50 picas long, total of 224 pieces	\$13.25

Bindery Area

1 hand-lever paper cutter, 19¼ or 19¾ size, with one knife blade and four cutting sticks, with stand	\$426.00
1 hand bookbinding unit, with work clamp opening 6½ inches, width between screws 18½ inches, trimming shelf, drilling jig, drill backstop, set of backing metals, and sewing frame board with uprights and cross bar	\$59.40
1 bookbinder's workbench, hardwood top 24x28 inches, 1¾ inches thick. Height 34 inches, angle iron legs and cross members, welded joints. One drawer	\$59.40

1 set bookbinding tools: 1 book saw, one 2x8-inch book trimming chisel, 1 backing hammer, 2 pairs 8-inch hand shears, 3 knives, three 7-inch paper folders, one 12x8-inch square, and 1 hand drill	\$21.55
1 assortment bookbinding supplies: 1 dozen $\frac{3}{32}$ -inch drills, 1 dozen needles, 3 skeins unbleached linen thread, one 2 $\frac{1}{4}$ -pound cake or 1 quart bookbinders' glue, 12 sheets each gray and white end papers, 30 yards 1 $\frac{1}{4}$ -inch gummed cloth tape, 5 yards backing cloth, 12 yards red and gold head banding, 12 yards of green and gold head banding, 1 roll $\frac{1}{2}$ -inch sewing tape, 10 sheets binders' board, 20x30 inches, 2 yards each of blue, black, green, red, and brown imitation leather covering	\$29.15
1 set of 4 pressboards, 9 $\frac{1}{2}$ x13 inches, 2 outside and 2 inside boards, plywood with brass binding on one long edge	\$9.35
1 card cutter, with 18-inch blade	\$22.00
1 automatic electric glue pot, quart size, with copper container	\$19.90

Platemaking Area

1 Ti-Pi Rubber plate kit with set of rubber plate engraving tools. 15-inch nickel-plated T-square, sharpening pad and set of blocks, one each 9x12, 6x9, 4x6, 3x5 $\frac{1}{2}$, and two 3x5 inches	\$15.40
1 linoleum block tool set, one $\frac{3}{16}$ -inch gouge, one $\frac{1}{4}$ -inch gouge, one $\frac{1}{64}$ -inch veiner, one $\frac{1}{8}$ -inch veiner, and 1 knife with adjustable blade	\$4.56

Silk Screen Area

- 1 silk screen unit, one printing frame, 12x18 inches, covered with No. 12 silk and mounted on 15x24-inch baseboard, with back bar, drop bar, and necessary hardware; one printing frame, 9x12 inches, covered with No. 12 silk and mounted on 12x17-inch baseboard, with back bar, drop bar, and necessary hardware
- 9 pints Naz-Dar Silk Screen Process paste paint, one each of the following colors: red, yellow, blue, green, brown, orange, purple, white, and black

2 film sheets, 8x10 inches	
2 film sheets, 11x14 inches	
1 8-inch squeegee	
1 11-inch squeegee	
1 pint No-Clog varnish	
1 pint film solvent	
1/2 pint stencil filler	
1/2 pint filler remover	
1 stencil knife	
1 lettering brush	
1 putty knife	
5 yards frame tape	
1 teacher's Manual	
1 copy <i>Elementary Silk Screen Printing</i> by Kosloff	
.....	\$39.60
1 school-type silk screen table, 80x30 inches, steel, with 16-inch lower shelf full length for holding silk screen units	\$97.25

Offset-Lithographic Area

1 offset plate maker or printer, substituting for a vacuum printing frame, for "burning-in" images on paper and zinc offset plates for use on the offset press. Some makes are:

Multigraph Exposure Frame, No. 1470, image size 9¾x13 inches, with timer, space: 15¾x22 inches . . . \$84.00

Dittoluth Master-Light M-2, image size 11x16 inches, with timer, space: 21x24 inches . . . \$169.00

Remington-Rand Plastiphoter No. 500, image size 10x16 inches, with timer, space: about 15x20 inches . . \$125.00

1 offset printing press, office-type or regular offset-lithographic professional machine. The table on page 46 presents most of the popular makes and data concerning them:

OFFSET PROCESS PRINTING MACHINES

Name of Machine	Moistening & Inking Rollers	Comb. Ink & Moistening Rollers	Maximum Paper Size, inches	Minimum Paper Size, inches	Maximum Image Size, inches	Thinnest Paper Stock, weight	Thickest Paper Stock, weight	Practical to Hand Feed	Speed, Imp. per minute	Motor, h.p.	Floor Space, inches	Weight, lbs.	Price, dollars
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DUPLICATORS

Multilith (Multigraph) Model 50	yes	no	9 $\frac{3}{4}$ x14	3x3 $\frac{1}{2}$	9 $\frac{1}{2}$ x13	16	post card	yes	70	$\frac{1}{6}$	20x34	165	650
Model 75	no	yes	9 $\frac{3}{4}$ x13	3x5	9 $\frac{1}{2}$ x13	16	post card	yes	80	$\frac{1}{3}$	21x45	—	1300
Model 80	no	yes	9 $\frac{3}{4}$ x14	3x3 $\frac{1}{2}$	9 $\frac{1}{2}$ x13	16	post card	yes	70	$\frac{1}{6}$	20x34	168	825
Model 1250	yes	no	9 $\frac{3}{4}$ x14	3x5	9 $\frac{1}{2}$ x13	13	3-ply	no	50-100	$\frac{1}{3}$	28x60	640	2100
Davidson Model 221	yes	no	10x14	3x5	9 $\frac{3}{4}$ x13	light weight	card-board	no	90	two $\frac{1}{4}$	28x61	1065	2095

OFFSET PRESS

ATF Chief Model 20	yes	no	14x20	8x10	13x19 $\frac{1}{2}$	9	4-ply	no	60-62	$\frac{1}{2}$	41x58	1700	5960
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COMBINATION OFFSET AND LETTERPRESS PRESS

Davidson	yes	no	10x14	3x5	9 $\frac{3}{4}$ x13	light	card-	no	90	two	28x61	1100	2215
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Consumable Supplies

The supplies necessary for any shop activity depend mainly on the size of the class, grade level of the pupils, kind of activity, and the projects or processes that are included in the teacher's plan of instruction. The list which follows is based on the needs of the five-pupil grouping in Graphic Arts in a shop area including four or more activities; it covers needs for the usual 36-week schedule of six periods per day. Supplies consist of materials consumed in the making of Graphic Arts projects, such as paper, ink, type, cardboard, and binding cloth. This list is suggestive, and will, of course, vary in the local situation. The teacher should use it as a guide and not as a final form for requisitioning. Supplies commonly used by the entire school system are not listed here.

Because consumable supplies are in large measure similar in nature to those items normally purchased by the established schools, no prices are given for them. It will be noted that certain consumable items are contained in the equipment section of this bulletin. This is done to show the prices of such units of instruction as are usually purchased in sets.

Layout Area

- 1000 sheets Semi-transparent tracing paper, 8½x11 inches
- 3 dozen No. 2 pencils
- 3 dozen No. 6 pencils
- 5 Wooden line gauges, up to 72 picas one side, 12 inches on the other side
- 1 Drawing board, 12 by 18 inches
- 1 T-square, to fit 12 by 18-inch drawing board
- 1 90° and 45° plastic or celluloid triangle
- 4 quarts Paper cement (often called "rubber cement")

Composition Area

- Quoins—replacements as needed
- Type—replacement as needed
- Proof paper—normally in sizes 6x9, 9x12 inches in size, English finish stock, 1,000 sheets of each size
- Proof press ink—tubes as needed
- Type cleaner—one gallon

Bindery Area

- 2000 sheets 17x20—20 white sulphite bond
- 500 sheets 17x22—20 blue sulphite bond
- 500 sheets 17x22—20 pink sulphite bond
- 500 sheets 17x22—20 canary sulphite bond
- 500 sheets 17x22—20 green sulphite bond

100 sheets	20x26—50 white cover, cut 13x20
100 sheets	20x26—50 blue cover, cut 13x20
100 sheets	20x26—50 red cover, cut 13x20
100 sheets	20x26—50 green cover, cut 13x20
500 sheets	25½x30½—110 white index bristol, cut 12¼x30½
100 sheets	25½x30½—110 blue index bristol, cut 12¼x30½
100 sheets	25½x30½—110 green index bristol, cut 12¼x30½
100 sheets	25½x30½—110 canary index bristol, cut 12¼x30½
100 sheets	22½x35—250 white bristol, cut 17½x22½
1 quart	Red padding glue
1 bundle	26x38—80 clip board, cut 19x26
500 sheets	Newsprint, flat, any available size, cut for use on 19-inch school cutter
12	Cutter sticks to fit make of 19-inch paper cutter
1000	White sulphite bond envelopes No. 6¾, 20-pound substance
1 bundle	Binders' board, 23x28 No. 18
1 bundle	Binders' board, 23x28 No. 25
1 roll	Gummed cloth tape, black, 450-foot roll, 2-inch
1 roll	Gummed cloth tape, red, 450-foot roll, 2-inch
1000	No. 88 bristol cards, 240 substance, 2x3½ inches

Pressroom Area

2 one-half pound tubes	Red ink
10 one-half pound tubes	Black ink
2 one-half pound tubes	Blue ink
2 one-half pound tubes	Green ink
2 one-half pound tubes	Yellow ink
5 sheets	Miscellaneous thicknesses of red press-board
1 dozen	Megill Spring Tongue Gauge Pins
1 roll	12-inch tympan paper, oiled
500 sheets	Caliper ⅜, 000-inch makeready tissue
500 sheets	Caliper ⅜, 000-inch French folio
2	Makeready knives
2	Ink spatulas, 6-inch
2 pints	Sphinx makeready paste

Platemaking Area

Linoleum blocks, mounted on wood to type height (.918) in the following sizes as needed:

- 3 each 2x2 inches
- 3 each 2x3 inches
- 3 each 4x6 inches
- 3 each 5x8 inches
- 3 each 6x9 inches
- 3 Ti-Pi rubber plates, mounted to type height, each 12x18 inches

Silk Screen Area

No. 12 silk screen—as needed	Film solvent
Process paste paint	Stencil filler
8x10-inch film sheets	Filler remover
Varnish	Frame tape

Offset-Lithographic Area

Master offset plates—5¢ to 30¢ each (see various makes available).
“Paper” and “plastic” offset master plates may be prepared by drawing in pen or grease pencil, by typing on typewriters or by printing on the school letterpress platen. Pupil projects like Christmas cards, for example, can be set in type and printed letterpress for name and verse, and illustrated by hand directly on the offset plate for printing the illustration. One plate is necessary for each color.

Presensitized “paper” and “plastic” offset plates, for particular type of press used—about 50¢ each.

Such plates can be made from negatives or from a substitute for negatives.

Zinc offset plates—as needed.

The cost of making a negative and zinc plate from any illustrated copy, line work only (pen-and-ink sketches) runs from about \$3.30 to \$5.00 each for the 10x14-inch size. If photographs are used for copy, they must be screened in the negative. Such plates are charged for at time rates.

Bottle of plate etch—as required.

Bottle of press wash fluid—as required.

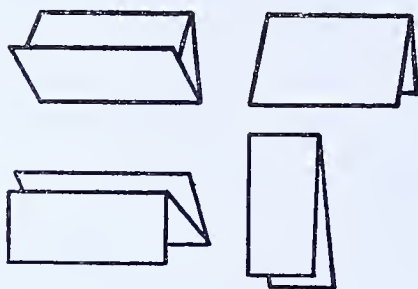
Bottle of fountain etch—as required.

STORAGE OF TOOLS, SUPPLIES, AND PROJECTS

The storage and arrangement of tools are best taken care of in the Graphic Arts area of the comprehensive general shop through the use of tool panels, on which all tools are hung in plain sight of the pupils and teacher. With the outline of each tool painted on a colored background in white paint, it is easy to see what tools may have been inadvertently mislaid by the pupils. A check of these tool boards at the close of each period will help the teacher and the pupils get all items of equipment and tools back into their proper places.

Each pupil, while in the composition area of the Graphic Arts area, should have an 8¾x13-inch galley for the storage of his type forms. He should also have his own type case assigned to him when working on beginning projects in type composition.

Each pupil, likewise, should have a locker or storage space for his unfinished bookbinding, platemaking, silk screen work, and other work in progress. The individual teacher will have to work out a scheme for this. There is no hard and fast procedure for such storage.



7 *Suggested Shop Layouts*

FOR FIVE PUPILS

PLANT LAYOUT for the Graphic Arts unit calls first for an area surrounded by glass so that the work is separated from other areas like woodworking, for example, where the collection of sawdust on printing equipment would be objectionable.

Paper and other supplies, such as type wash and kerosene, may be kept in the general shop tool and supply storage rooms. However, if the teacher prefers, shelves may be made at overhead height, or under tables in the Graphic Arts area.

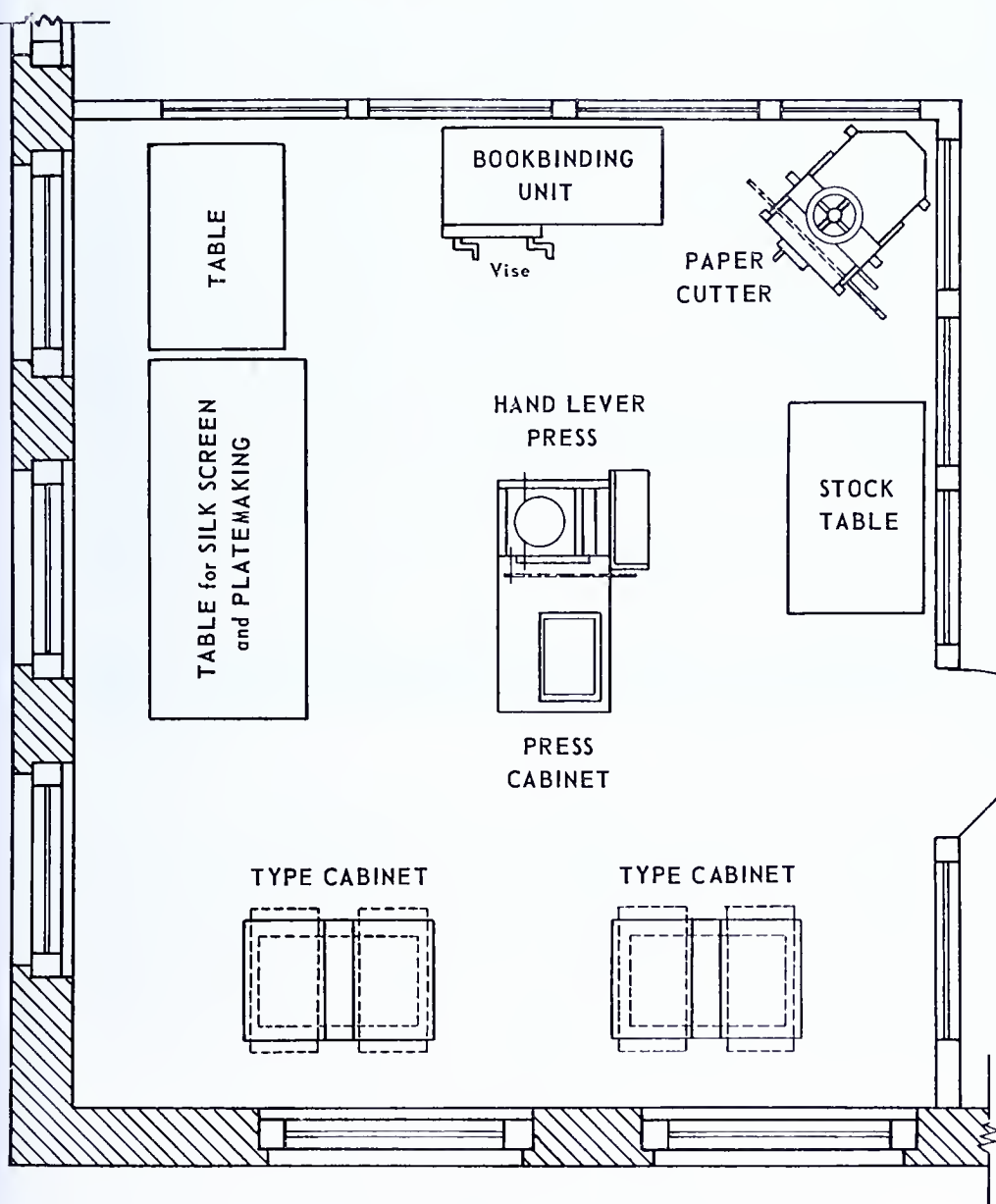
Consideration should be given to the probable growth of the Graphic Arts area. It may be found, after a year or two of operation, that another press or a power press should be added, or more type faces may be needed which call for cabinets to hold the cases in which the type is stored. It is better to have more space than needed 'at the outset than to have cramped quarters later.

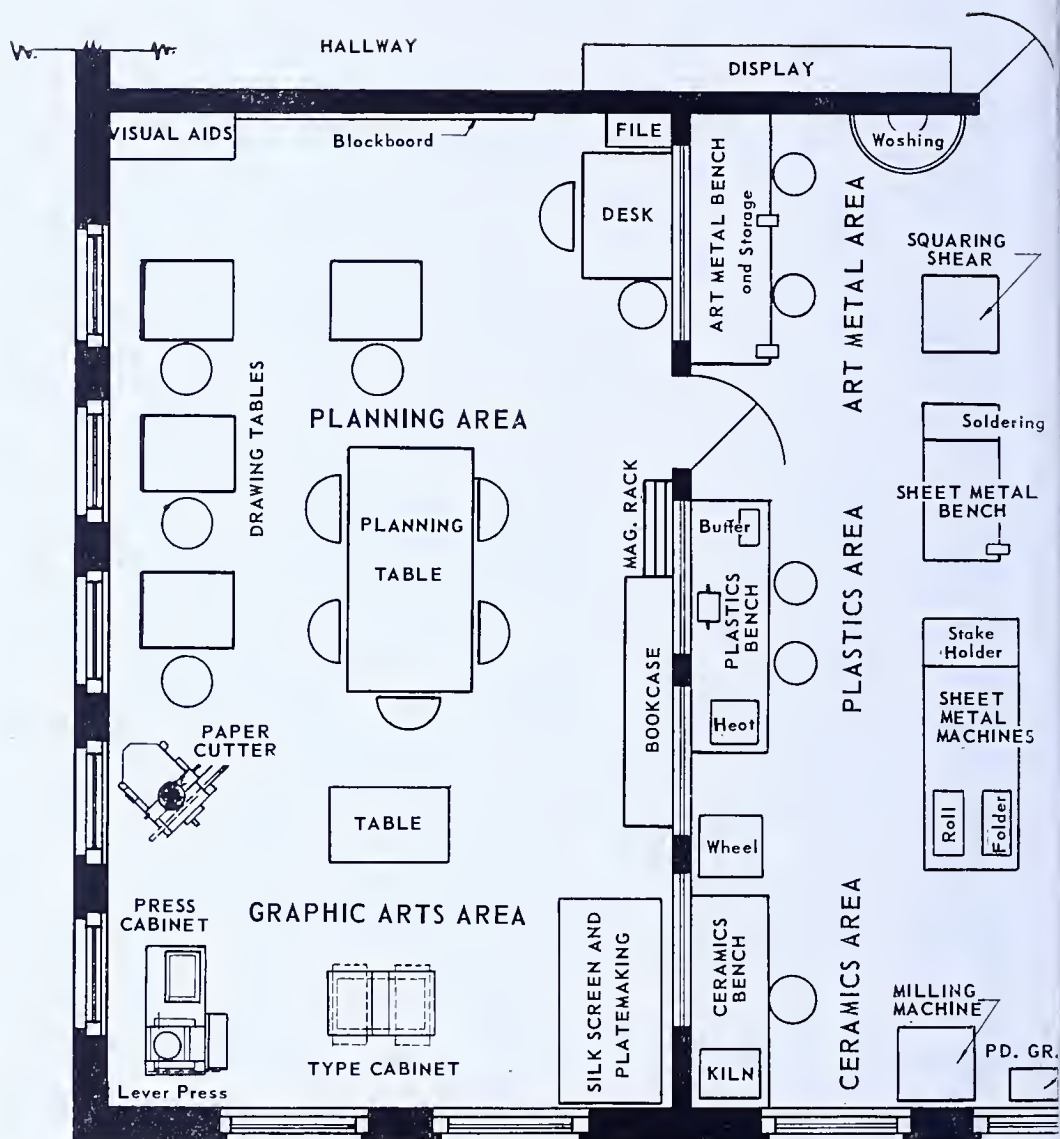
Plans A, B, and C show three sizes of shop layouts for typical Graphic Arts areas in the comprehensive general shop.

The question "How much does a Graphic Arts area cost?" can only be answered by a counter question: "What kind of area do you want?" The barest essentials for the smallest area would cost at July, 1951 prices, approximately \$880.00. (See Plan B, pages 52-53.) Cost of other layouts depends upon the extent to which the school system wants to develop its Graphic Arts program.

Plan A

This plan as illustrated shows two type cabinets, a table for silk screen and platemarking, a bookbinding unit, a paper cutter, and a press cabinet which holds the letterpress platen press. This equipment limits the activities to composition, letterpress presswork, silk screen, layout, bookbinding, and platemarking. Since this layout does not include a proof press, all students use the printing press for making proofs. Where funds are limited this plan is recommended for starting the activity. The area occupies 306 square feet, and accommodates five pupils. Approximate cost, \$1625.00.

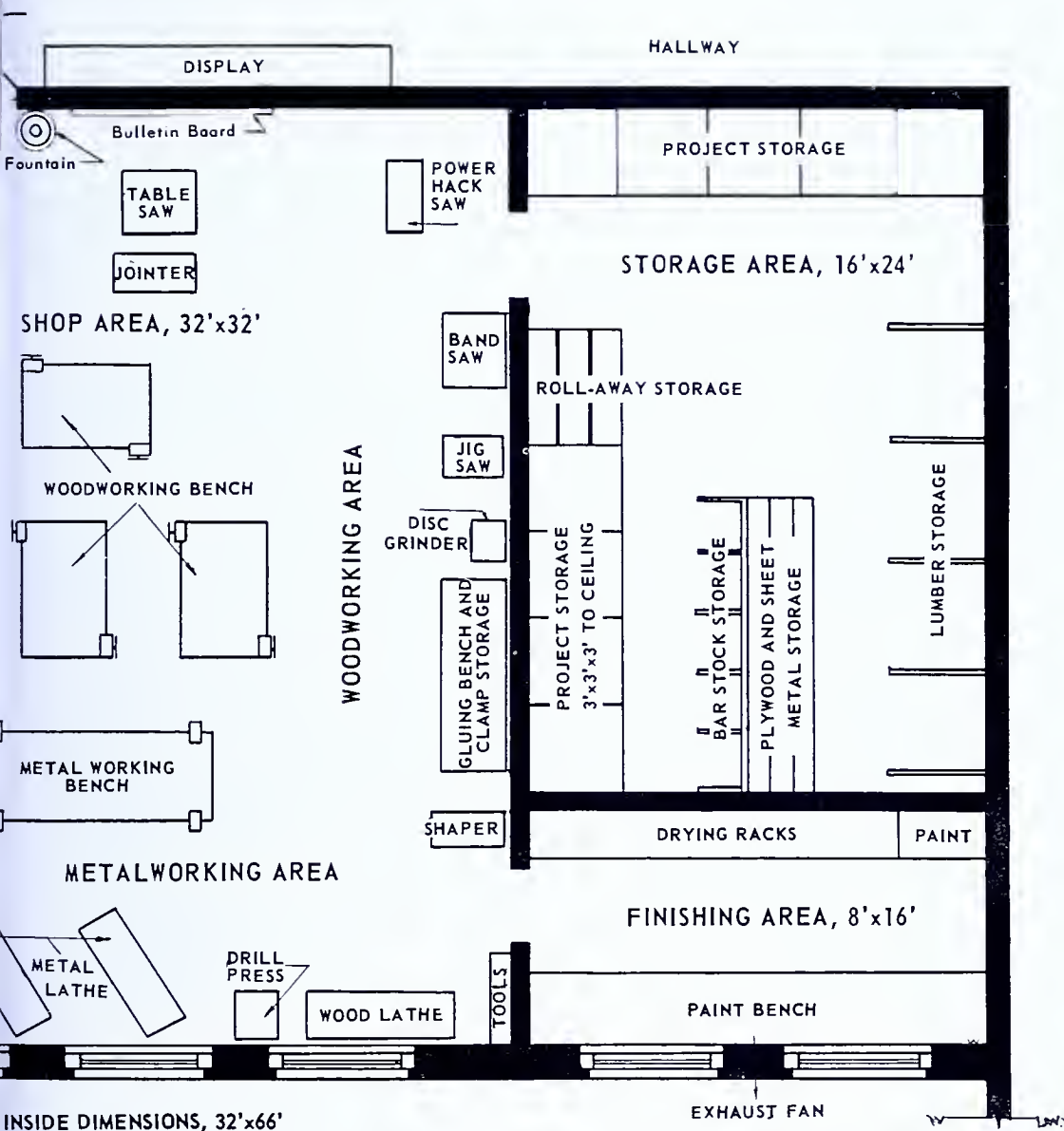




Plan B

In Plan B the Graphic Arts area (located at lower left of the illustration) is shown as an integral part of a comprehensive general shop which includes the following areas of activity: planning, ceramics, plastics, art metal, woodworking, graphic arts, and metal working.

If desirable, a slight rearrangement would allow for a partition between the Graphic Arts area and the Planning area.



This plan for equipment and its arrangement is the simplest of all Graphic Arts units in the comprehensive general shop. In it are the bare essentials for instruction through letterpress printing comprising hand composition and platen presswork, silk screen and platemaking. Five pupils can be accommodated. The square foot area is 204. Approximate cost is \$880.00.

Plan C

Plan C, as illustrated, contains all equipment contained in Plan A, with added proof press, offset-lithographic press, platemaker for offset-lithographic press, and an extra table for plate development. This layout contains equipment for all the activities mentioned in this bulletin. Square foot area is 378, and five pupils are accommodated. This layout will provide for adult evening classes in Graphic Arts. Approximate cost, \$2750.00.

